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# EDITORIAL

T O M A T W O O D

## AT THE '93 NATS

John Jundt, one of our tireless and valued correspondents in the field, attended the Nats this year with camera and note pad in hand. Here are some of the highlights of the Nats that he reported to us:

"Wow! Hot—you bet! At the Mid-American Air Center, the site of the 1993 AMA Nationals, 'hot' was an understatement. On Friday, by 9:40 p.m., the temperature cooled down to 94 degrees Fahrenheit, and the humidity dropped to a level just below that of being able to support aquatic life. But as hot as the weather was, so were many of the performances in the R/C events.

"Just cross over, and do it! Chip Hyde, not content being idle between pattern rounds, decided to dash over, and for the first time ever, he tried Quickie 500 and Formula 1 pylon racing at the Nats. He did well. Of 119 entrées in Quickie 500—the largest number of participants ever—Chip came in third. The event was won by Greg Grunkemeyer.

"Next came Formula 1. Chip showed up not only with both thumbs limber and ready to go, but also with an innovative racer. The rules state that the Formula 1 racer must have two wheels and non-retracting landing gear. Chip's low-drag design placed the wheels in a single line—one behind the other—and in a streamlined fairing close to the fuselage's bottom. The launch went



*Claude McCullough prepares to take off in the fourth round of Precision Scale. (Photos by John Jundt.)*

straight as an arrow from positive ground control to positive air control. He was a top contender until a mid-air in the final round dropped him to ninth overall. Dub Jett won the Formula 1 event. We understand that by the end of the pylon event, there was a rumor of a new bumper sticker for sale that read,

'Help keep Chip Hyde out of pylon.' (Just kidding, Chip.)

"As some might have predicted, Chip Hyde won FAI pattern. Other pattern winners were Robert Caglis in advanced; Shawn McMurty in Sportsman; and Rob Richards in Masters. In Expert R/C Scale, Terry Nitsch won top static, best total flight score and first place overall. Terry also won the NASA judges' award for best overall scale performance. Curtiss Young-blood won F3C helicopter.

"This was the last year for Precision Scale; next year, it will be combined with either FAI Scale or Sport Scale Expert. It was fitting that the last Precision Scale event was won at the '93 Nats by one who has made so many contributions to the field of model aviation over the years:

Claude McCullough. As Claude walked off with his first-place award, the trophy seemed to be saying that this was not only a memorial to the last Precision Scale event, but also due recognition for Mr. McCullough, who has helped to make the hobby so enjoyable for us all.

"The high temperatures and humidity presented engine challenges in all the R/C events. Pylon racers seemed to be able to keep their engines running, but speeds were down from last year's. Pattern fliers complained about a lack of power, but they were able to adjust and avoid flameouts. However, over in R/C scale, there were a number of dead-stick landings. The pattern and pylon fliers clearly knew how to keep engines running smoothly in hot, humid conditions.

Competitors will need this knowledge for next year's 'bake off' in Texas."

### UPCOMING EVENTS

Three upcoming events are well worth attending if you can. The U.S. Scale Masters will be held from October 21 to 24 at

Mile Square Park in Fountain Valley, CA. You can find out more about this top-level scale competition from Harris Lee at (619) 945-3961. The fifth annual Superman Fan Fly, cosponsored by JR and *Model Airplane News*, will be held from October 1 to 3 in Metropolis, IL. For further information, contact Jerry Caudle at (618) 524-9979 (day), or (618) 634-9360 (evening). Also, the Madera '93 Unlimited R/C Air Race is an absolute "must see." It seems certain that speed records will be broken. For further information, contact The Unlimited at (310) 320-8369. ■



*"Model Airplane News" columnist Dave Patrick cleans his Finesse for the FAI competition. Dave finished an impressive fifth overall.*



*Chip Hyde explains his in-line, landing-gear wheel arrangement to Mike Stokes.*



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# AIRWAVES

**WRITE TO US!** We welcome your comments and suggestions. Letters should be addressed to "Airwaves," *Model Airplane News*, 251 Danbury Road, Wilton, CT 06897. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous numbers of letters we receive, we cannot respond to every one.

### ERRATA

In the "Video Views" column in our September '93 issue, the price of the AMA's "The Joy of Flying Free" video should have been listed as \$25 (not \$19.95). In the October issue, the prices of "Diamonds in the Sky" and "Those Marvelous Miniatures" also should have been listed as \$25. We apologize for any inconvenience.



### THE McMINNVILLE MONSTER

Our family took a trip up through the northwest corner of the "lower 48" and one of the more interesting side trips was to McMinnville, Oregon. I had heard that a new airplane museum is growing there so we went out of our way (McMinnville isn't on any major route) to find it. After wandering around the airport fruitlessly in our truck, we stopped in at the pilot's shop, and they weren't sure where it was but said that one of the buildings "over that way" had restorations going on and sometimes they welcomed visitors. We finally drove through forbidding gates and past industrial-looking installations, expecting to be told to leave at any moment. It was the right way, the museum is in the last hangar on the field and there were no signs whatever pointing to it. Moreover, it was open—strange that nobody seemed to know about it. Tiny when compared with the fine museum at Boeing Field, which we also visited, it was more exciting due to its informality. I was able to speak to a friendly man working there who showed me details of the internals of an ME109 wing, 50 years old, sitting unlabeled, without its skin, on a bench. As he complained that people keep on sending him items like that wing, he pointed out the very sloppy workmanship (they were partly built by

slave labor) when compared with work on U.S. aircraft of WW II.

The shop was dominated by a large, fabric-covered surface standing with its leading edge downward on a wheeled jig. The fabric was new, and the surface was clearly part of a restoration project. It was a large object that seemed to be half of a wing. It had a chord of nearly 20 feet and a span of about 50 feet with a peculiar, pointed-tip shape. It also had two cut-outs on its trailing edge, which I took as places that aileron and flap would be attached. On a nearby bench were the large, hinged parts that clearly fit into the gaps, confirming my guess. I struggled to place the half-familiar shape, and realized it was indeed half of a wing. The plane must have had a span of about 100 feet. In other words, whatever it was, it was the size of a B-17 Flying Fortress. The object was clearly part of an airplane, but of what airplane? A Stinson Trimotor perhaps? No, it wasn't right.

The leading edge of this artifact was a bit strange: it seemed to be a half-circle in shape, and there were some large slots cut into it; I wondered if they had been put there to mount the surface on the jig; no wing leading edge ever had slots like that. Also, the airfoil was symmetrical. Now I was really puzzled: what 100-foot span plane from the 1930's or 1940's had a cloth-covered symmetrical airfoil?

I walked around the monstrous part, to find that it completely hid a replica Fokker Triplane, a magnificently restored J-3 Piper Cub, and a rare Curtis-Wright A-22 (a development of the CW-21 Demon-Fighter). There was an auditorium beyond the planes and the seats looked oddly familiar. On close inspection I discovered that they were all from Boeing 747's, labeled A through K (very appropriate to an aircraft museum).

I returned to the mysterious panel and peered into an access hole at its framework. Suddenly I realized what I was seeing. It was staggering. What I had taken to be aileron and flap were trim tabs—the slots in the leading edge were where it was hinged. This was no wing. This was a control surface, in fact, the rudder to the Hughes HK-1 "Spruce Goose." I felt a bit dimwitted, since the immense flying boat was sitting, disassembled, in a nearby field. In retrospect I thought I should have



figured it out sooner. The immensity of that famous aircraft was brought home vividly. The rudder, a moveable part, is the size of a B-17 wing! The fin alone had a base chord of 40 feet.

Measured by wingspan (320 feet) the HK-1 is the largest plane ever built, and it is large indeed. Designed to accommodate 750 fully-equipped soldiers, it will be the centerpiece of the Evergreen AirVenture Museum when reassembled. I suspect that viewing the whole Spruce Goose will not have the striking effect that the rudder alone, sitting there on the shop floor, had on me. Assembled, you will only be able to get close to the fuselage; to people used to flying in 747's, it won't seem nearly so big. A quarter scale model of the HK-1 would have a wingspan of 80 feet!

JEF RASKIN  
Pacifica, CA

*Jef, thanks for recounting your visit to the Spruce Goose. Your perspective will be appreciated by many modelers, I'm sure, particularly the scale buffs!*

TA

### CAREFREE (SCREAMING) CONTROL-LINE DAYS

Our son's interest in airplanes became evident early on, and by age 11 he had become an avid modeler. So, by pleasant default, I re-entered the hobby when he expressed interest in building an R/C airplane. Together we built a Midwest Aerostar 40 which he successfully soloed not too long ago.

I grew up on Long Island in the late '40s and early '50s, but I had no money to pursue the hobby beyond a few simple gliders. But I did enjoy model airplanes by bicycling to local meets. I have often recalled those glorious days, or the "golden age" of model airplanes as we like to call it now, to our son. Who can forget the pulsating roar of a Dyna jet, or the scream of a Dooling .61 encapsulated in an asymmetrical speed ship?

Yes, I was once again reminded of those carefree control-line days when I came across Dennis Atkins and Ray Abadie's articles on noise reduction. It

(Continued on page 104)

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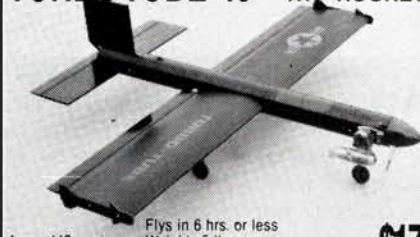
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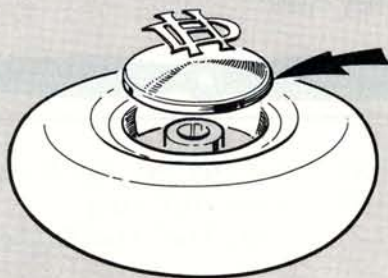


# HINTS & KINKS

JIM NEWMAN



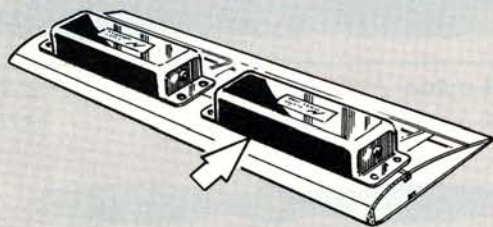
*Model Airplane News* will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Hints & Kinks." Send a rough sketch to Jim Newman c/o *Model Airplane News*, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can't acknowledge each one, nor can we return unused material.



## EASY HUBCAPS

Custom-make hubcaps with the top part of the metal, self-cover buttons that are available at the notions store. They come in many sizes and can be attached with very small sheet-metal screws or PFM adhesive. Cut a company logo, such as that for Piper or deHavilland (shown), out of thin card or plastic, paint it, then attach it to the hubcap with a small dab of PFM.

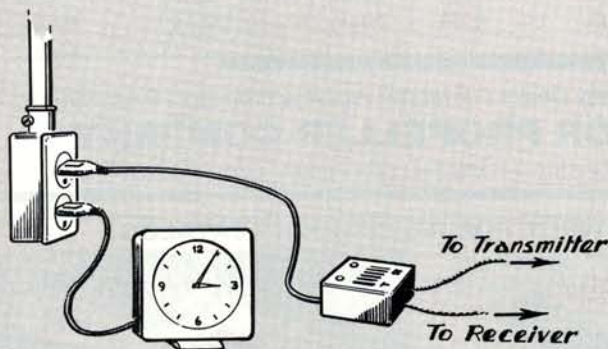
Richard Baylis, Westmount, Quebec, Canada



## NO-COST WEIGHTS

Ask your electrician if he has any old fluorescent-light ballasts. Weighing 3¼ pounds, they're useful to weight parts down when you're building. To avoid damaging wooden parts, cover the bottom of each weight with rubber (use pieces of old tire inner tube).

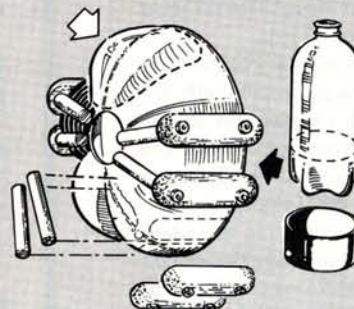
Don Sektnan, Eagan, MN



## "POWER OFF" TELLTALE

Plug in an analog clock, i.e., one with hands, along with your battery charger. If the power goes off when you aren't home, the clock will show how long the power has been off (a digital clock will not), and you'll be able to adjust your charging time accordingly. Test the clock to be sure it will automatically start again when power is resumed.

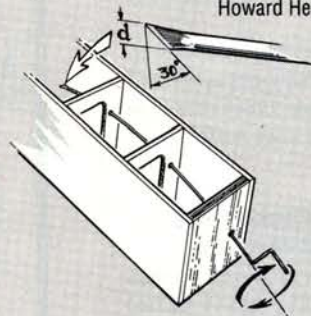
Andrew Burgdorf, Wantirna, Australia



## DUMMY RADIAL ENGINE

Cut the bottom off a 2-liter soft-drink bottle, then, using pieces of balsa wood and dowel, convert it into a dummy radial engine for fun scale. (Cut away the center to make it fit around the glow engine.) To make your "engine" look more realistic, glue small nuts to the "rocker covers," and paint the cylinders in black and silver stripes. Attach the pushrods and "rocker covers" after painting—it's easier!

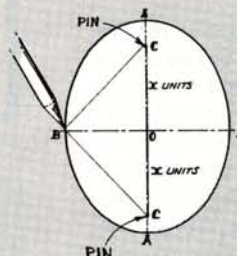
Howard Herin, Bellingham, WA



## FLEXIBLE EXTENDED DRILL

Make this useful drill out of coat-hanger wire. Beat one end flat, and grind it to a point to give the diameter (d) you need. You'll be able to curve your drill slightly while drilling holes deep in a framework. Note the built-in crank handle.

Ron Helmer, Birch Run, MI



## HOW TO DRAW AN ELLIPSE

The formula is  $x = \sqrt{A^2 - B^2}$ . Distance A-A is the height of the ellipse; B-B is its width; O is its center. Example: distance A-A is 20 units and B-B is 12 units. Distance O-A = 10;  $10^2 = 100$ . Distance O-B = 6;  $6^2 = 36$ .

So: distance O-C =  $\sqrt{100 - 36} = \sqrt{64}$ , and  $\sqrt{64} = 8$ . Therefore, distance O-C = 8. Stick pins at C, and put your sharp pencil point at B with the cord tied around all three. Draw your ellipse, keeping the cord tight.

Kevin Wilder, Vancouver, BC, Canada



# SIMPLE PROGRAMMING



DAVID C. BARON

## HIGHLIGHTING THE D.A.D. CONTROL MIXER

EVERY ONCE IN a while, a truly revolutionary device comes along, and when it's also reasonably priced, it's really a pleasure to present it to you. This month,



*The Hobby Supply South D.A.D. is a small, light, reasonably priced multi-function control mixer. It's the least expensive way to add expensive mixing features to your radio.*

I review Hobby Supply South's\* D.A.D.—or Digital Aircraft Doohickey. Though the name may fall a little short, the unit's four basic features (functions) are valuable, effective and easy to operate. They include:

- a unidirectional mixing circuit;
- a bi-directional mixing circuit;
- travel-volume control with exponential for two channels at a time;
- a servo slew mode for slowing down flap, retracts and gear-door servos to scale speeds.

The unit is extremely light. At 0.6 ounce, it's smaller than an average servo and should easily fit into the smallest models. Its list price is only \$39.95, and Hobby Supply South sells dealer direct. It's the least expensive way I have seen yet to get some pretty expensive features for your aircraft!

### MODE SETUP

The unit has a bank of eight switches on its end. The first two switches establish which mode is to be selected. The next two switches (3 and 4) control the expo-

mental rate, which is available in all modes except the servo slew mode. Switches 5, 6, 7 and 8 are all used to establish travel or mix percentage adjustment in modes 1 through 3 and servo speed in mode 4.

The directions for hookup are so simple that you'd have to try really hard to get it wrong. Simply set the switches on the end of the unit to the settings that activate each mode, and plug in your servos to the appropriate ports. The laminated reference card provided with the unit makes all this very clear and easy to follow.

Let's look at each "mode," or "function," individually.

*Note: if you are switching between modes (functions) to experiment with your unit, you must turn the airborne off and on between each mode change.*

### MODE 1

• **Basic master/slave mixing.** Mix any two channels so that one channel (the master) will influence the motion of another channel (the slave). This feature is commonly used to slave flap throw to the retracts. When the gear is lowered, flaps are partially lowered to allow more lift and, hence, shorter takeoffs and less wear and tear on the retracts. For landings, it produces a more stable approach (owing to the washout configuration of a partial-flap condition) and a better flare.

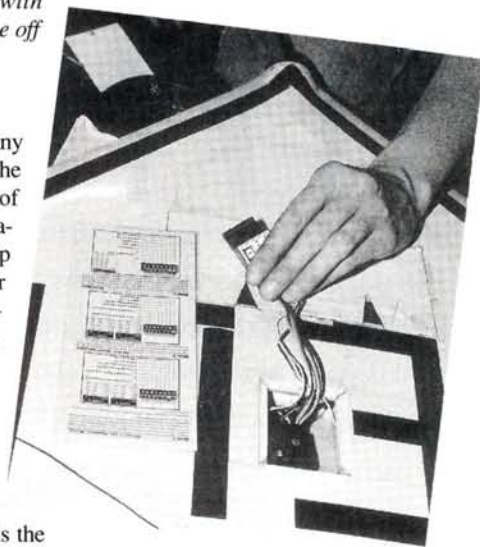
For gliders, a favorite condition is the slaving of the elevator to the throttle stick, which creates a monster trim lever out of the throttle stick. This makes fine-tuning elevator trim a cinch, when you're milking lift for all that you can get.

For the world's simplest helicopter, you could convert any stock, 4-channel radio into an acceptable entry-level radio by slaving the rudder to the throttle. This would give you anti-torque compensation throughout different throttle settings. For the collective-to-throttle mix,

a Y-harness, or even a single servo driving both the throttle and the collective, may be all that is necessary for learning to hover and for accomplishing forward flight! Some manufacturers of entry-level helis, e.g., Hirobo\* (the Shuttle), give instructions on how to set up these types of mechanical mixes for the collective.

### MODE 2

• **Two-way-mix configuration.** This is the most-used mix; it commonly sees duty as elevons, vee-tail and flaperons. As you can see in the photos, I have applied the mixer to actuate the elevons in a flying wing. Owing to the flexibility of the D.A.D.'s volume control in each mix, it was easy to set the ailerons



*The unit has been installed in my electric-powered flying wing. The information-packed instruction card is shown to the left; it greatly simplifies function setup.*

"hot"—the way I like them—and the elevator "tame." (On this design, pitch control requires very little throw.) The transmitter trims work as they should: both elevons move up with up trim and in opposite directions with aileron trim. This impresses me, because some brands of



## FUTABA FLAGSHIP—THE 9ZAPS

This radio is a big step above Futaba's last "super" radio—the 9VAP. It has the same number of channels, but the similarity ends there. Futaba fans have waited a long time for the 9VAP's successor, and Futaba has done a lot of research. The 9ZAPS is certain to become the standard against which all other radios will be judged.

This radio is so flexible that it can be "fitted" to its owner's modeling interests as well as it can to his hands. It has every aircraft-programming function that I have ever heard of, plus all the latest sport, competition glider and helicopter programming built in.

The feel of the radio can be modified by adjusting the angle of the sticks. They can be canted "inward" by as much as 3 degrees, or "outward" by as much as 4.5 degrees. This, along with the traditional adjustment of the tension and length, makes a system that can be closely tailored to a user's grip. Another "user comfort" feature is the adjustable angle of the antenna!

Of course, the most impressive feature is this radio's capability to transmit on any of the 50 channels in PCM or PPM. This feature is very easy to use, and the radio allows channels to be changed without a signal being transmitted. (It would be embarrassing to shoot down all your friends at the flying field.)

The second most impressive feature is "condition" setting. This may not seem intriguing at first, but the more you work with it, the more valuable it becomes. It allows travel throws, exponential, sub-trims and programmable mixing values to be varied simply by throwing a switch! It can be a combina-



*Futaba's flagship radio—the 9ZAPS—will be discussed in detail in the next "Simple Programming" column.*

tion of all of those items or one at a time. There are eight conditions available for any given model.

In a new aircraft, this will reduce the time spent on experimenting with new settings to mere minutes. Conditions that are successful for one aircraft can even be named and catalogued for use in other aircraft. The heli fliers have been using similar programming for years: one condition for hovering; one for forward flight; and, usually, another for inverted and aerobatics. (You can just imagine all the programming involved in each condition.) With aircraft setups, you can experiment with some really creative programs, or you can fine-tune the setups you are currently using.

Here are two reasons to buy this radio:

- It has so many features that it can be

tailored to any application in our great hobby. Be it airplane, heli or glider, you are covered with every function yet conceived to reduce your workload.

- If you're already a serious flier and have invested a great deal in extra flight packs for your current radio, then you are aware of the loss that can be incurred when it's time to sell your old radio. The extra flight packs, and especially the receivers, are often sold at a price that's far below their true value. The only other choice is to buy a truckload of new crystals and then have all your old receivers tuned to your new radio. With the 9ZAPS, all your existing, 1991, approved Futaba receivers are fully compatible because the transmitter accommodates them!

Find out more about this truly incredible system; read next month's column for a full review of the 9ZAPS!

programmable transmitter that cost much more do not have this feature.

### MODE 3

#### • Exponential (expo) and travel throw.

This offers you exponential and travel-throw reduction for up to two channels. Expo may be used to tame a sensitive flight control without losing full deflection for certain maneuvers. The travel-limiting capability is great for matching a throttle-servo's throw to the carburetor's throw, or for the very slight motion necessary to move a bomb drop or a pneumatic valve for retracts.

### MODE 4

- **Servo slewing.** This is one of the great new gadgets of the '90s. It can change your servo's speed to simulate the retraction speed of scale landing gear. It may also be used effectively in sequenced gear-door applications and to simulate electric-flap deployment. It even has a built-in fail-safe that will reverse the direction of motion at full servo speed (if you change your mind while the unit is driving the servo!). If your engine quits on takeoff after you've started to retract the landing gear, this could be a lifesaver.

### CONCLUSION

This unit has a lot of value, and I strongly recommend it. If you're interested in its current drain, I have been told that it is less than that of a single servo at idle. It should only be used in 4.8V applications; 5-cell battery packs or BEC systems could damage it.

Safe flying, and see you next month.

*\*Here are the addresses of the companies mentioned in this article:*

**Hobby Supply South**, 5060 Glade Rd., Acworth, GA 30101; (404) 974-0843.

**Hirobo**; distributed by Altech Marketing, P.O. Box 391, Edison, NJ 08818-0391.

**Futaba Corp. of America**, 4 Studebaker, Irvine, CA 92718. ■



# AIR SCOOP

CHRIS CHIANELLI



*New products or people behind the scenes; my sources have been put on alert to get the scoop! In this column, you'll find new things that will, at times, cause consternation, and telepathic insults will probably be launched in my general direction! But who cares? It's you, the reader, who matters most! I spy for those who fly!*



## Color-Coded

**H**ow many times have you heard this one?:

"Oh, no! I've got the tubing all mixed up. I can't remember which line is which." It happens to all of us, e.g., hooking the vent line to the carburetor only to have the engine go dead shortly after takeoff, sometimes ending in disaster. With Horizon's silicone Dynamite Lightning Line, you'll never have to second-guess which line is which. Dynamite Lightning Line comes in neon yellow, neon green, neon pink and neon red. Decide which color is for which function: vent, feed, or overflow. Use the coding system on all your planes, and never again will you be seen scratching your head at fuel-up time. Contact Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821.



## Bird Dog

**R**oy Vaillancourt of Vailly Aviation has just completed work on a 1/4-scale version of the Cessna L-19—the famed army O-1 bird dog. It has a 108-inch wingspan and a wing area of 1,450 square inches. The plans show all the structures drawn full-size and include the installation of flaps. Full-size templates are also shown for ribs, formers and other parts. All structures are built up and sheeted with balsa; no foam is used at all. A fiberglass cowl and formed-aluminum landing gear are available. Contact Vailly Aviation, 18 Oakdale Ave., Farmingville, NY 11738-2828; (516) 732-4715.

## THE CYCLOPS PROJECT



**T**hirteen-year-old Elizabeth Berry stands with her father's Giant Fantrainer RPV, which he developed during the past few years. Joe Berry writes, "This is not a commercial

venture and was undertaken to prove that a working system could be developed with regular R/C hardware and amateur television equipment—a reliable system that any builder could duplicate."

The contraption on the trailer is the flying booth. We're going to investigate further, and we'll keep you updated on Operation Cyclops.



## A new Horizon for SAITO

**M**r. Saito is apparently quite happy with a recent agreement. The well-known and widely used Saito line is now exclusively distributed by Horizon Hobby Distributors. Not only will Horizon bring their years of professional customer-service experience to the Saito line, but I've also been told that single-part prices will undergo significant reductions. The engine that Saito-san is holding is the new FA-100T twin. It features a pump-pressurized crankcase for superior low-end lubrication and dual carburetion, which the manufacturer feels will offer more power and better idle. For more information on Saito engines and the nearest Saito dealer, contact Horizon Service Center at (217) 355-9511.





## THE LOW COST OF HIGH TECH

**H**obby Supply South has just introduced their D.A.D. (Digital Aircraft Doohickey)—a small, light, versatile, low-power-drain, multi-mode, 2-channel mixer. According to Hobby Supply South, the D.A.D. incorporates a 20MHz digital microcontroller that offers versatility and precision previously unavailable in after-market mixing circuits. The unit, which plugs between the receiver and the servo(s), offers master/slave-mix (rudder/aileron, throttle/elevator), full-mix (vee-tail, flaperons, etc.), exponential/rate-reduction ("softer-center" exponential with selectable servo travel limiter) and a delay mode from 2 to 30 seconds (slow gear retraction, flap deployment and gear cycling). I think this thing is great. (See all the details in this month's "Simple Programming" column.) The best part of all, it retails for only \$39.95! Contact Hobby South Supply Inc., 5060 Glade Rd., Acworth, GA 30101; (404) 974-0843; fax (404) 974-6243.



**B**ill Price, head designer at G&P Sales flying boat California Skunkworks, has completed work on this Navy PBN Nomad. With a 104-inch wingspan, the Nomad runs on two .60 2-stroke or two .80 4-stroke engines and weighs in at approximately 17 pounds. Like other G&P flying boats, it's made of fiberglass with a sheeted foam wing and stab. Obviously, the Nomad is a lot like the PBY series except for its clipper bow and taller vertical fin with counterbalanced elevators and rudder. The first round of flight tests have revealed that Nomad's water handling is excellent (probably owing to the clipper bow). Owing, no doubt, to its greater vertical stab area, its flight performance is slightly better than the already docile G&P Sales PBY. Contact G&P Sales, 410 College Ave., Angwin CA 94508; (707) 965-1216.

## FLYING BOAT SKUNKWORKS

## ZIROLI'S OLE TIGER

**M**adera '94 will introduce a new class of R/C model plane racing. These models will be 42-percent-scale Formula 1 racers. This seems to be a logical addition to the Unlimited and AT-6 events currently scheduled to run. It should come as no surprise that Nick Zirola Sr. is "designer on the spot" with his F1 racer, the "Ole Tiger." Construction is all built-up balsa, plywood and hardwood. The wingspan measures 72 inches with an area of 1,500 square inches. The plans also show an 82-inch sport aerobatic wing. Building both wings will be like getting two planes in one. New F1 rules specify the use of 4.6ci maximum engines of any type, and tuned pipes aren't allowed. The plans cost \$38 postage-paid in the U.S. Available accessories include a cowl, wheel pants, a canopy, a pilot, aluminum landing gear and a wing-mount tube set. Contact Nick Zirola Plans, 29 Edgar Dr., Smithtown, NY 11787; (516) 234-5038.



## AERO\*COMP™

VERSION 2.0  
USER'S GUIDE



## FLY by PC

**H**ave you flown your new designs on your PC before they're built? You can save a lot of time and effort and wind up with better models. AERO\*COMP is a powerful tool for predicting the performance of electric-powered aircraft (see our November '92 review). Version 2.0 includes data on more than 100 commonly used motors (from "micros" to the Astro Flight 90 cobalt), and you can add 50 more. You can now control cell voltage, impedance and wiring resistance, and there are options for airfoil type, fuselage type and landing-gear data. Version 2.0 also provides motor horsepower, average climb angle, best angle of attack for glide, glide time and max flight time in still air, and you can use metric or English units of measurement. For more information, contact USR&D at (908) 850-4131.

## Heli Herring



## Chopper Soup



## Rotor Head





# PILOT PROJECTS

## A LOOK AT WHAT OUR READERS ARE DOING

### SEND IN YOUR SNAPSHOTS

*Model Airplane News is your magazine and, as always, we encourage reader participation. In "Pilot Projects", we feature pictures from you—our readers. Both color slides and color prints are acceptable.*

*All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of 1993. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!*

*Send those pictures to: Pilot Projects, Model Airplane News, 251 Danbury Rd., Wilton, CT 06897.*



### AWESOME ALBATROSS

James Vier of Austin, TX, built this wonderful Grumman Albatross from a G&P Sales kit. The fuselage is made of fiberglass, and the wings and tail feathers are foam covered with glassed balsa sheeting. The model has an 81-inch wingspan, retractable landing gear, flaps and operating navigation and beacon lights. It's powered by two O.S. SF .46 engines, and a Conquest 6-channel Futaba radio keeps it under control.

### STUDENT CUB

Jim Hansen of Mayville, NY, sent this photo of his full-size J-3 Cub, shown with a stand-off scale model of it that was built by his R/C student, Jack McArdle of Buffalo, NY. The model was built from a Carl Goldberg kit and is powered by a Saito .50 4-stroke engine. Jack controls the model with a Futaba radio and says the model's flying characteristics are as good as its looks.



### EXTRA HELP

Brad (left) and Logan proudly hold Dad's first scratch-built model—the Extra 3.25. Frank Couce of Charlotte, NC, built it from *Model Airplane News'* pull-out plans and installed an O.S. FP .25 engine. But wanting more speed and power, he replaced it with an FP .40! Frank says, "Now it really scoots!" But we think that dear ol' Dad *does* need all the help he can get!

### HER MAJESTY'S ROYAL PATRIOT

Done up in British Royal Air Force colors, this Great Planes Patriot is the work of Gary Russell from Muncie, IN. The model is powered by an O.S. .46 engine equipped with a pump and a pipe. Gary burns 20-percent-nitro fuel and says that the model is very fast. Hobbico retracts and a JR Max 6 radio complete this RAF speed demon.







## EXTRA FAMILY PET

Jack Christian of Jacksonville, NC, says that his family's newest pet is his scratch-built Extra 3.25—designed by Rich Uravitch as a pull-out plan for the January '93 issue of *Model Airplane News*.

The model is powered

by an O.S. FP .25 engine and covered with MonoKote. Jack's daughters, Rebecca, with the white dog, and Amelia, with the brown dog—who are all aviation enthusiasts—show off Dad's newest winged addition to the family. Since Jack didn't give us the names of the doggies, we have to assume they're both "bird dogs!"



## GREAT BLUE BEAR

This 1/5-scale Grumman F8F Bearcat was scratch-built from Ziroli plans by Harry Haught of Bridgeport, WV. The 25-pound model is powered by a Quadra 52 gas engine that's equipped with a Byron PurrrrrPow'r exhaust and engine mount system and controlled by a Futaba radio. The model has bombs and rockets that drop, functional flaps, navigation lights and tail hook, and it's detailed with rivets and panel lines. Harry finished it with fiberglass cloth, Hobbypoxy resin and acrylic paint. In front of a Grumman Aircraft building with Dad's Navy fighter are Susie (standing) and Amy.

## STARDUSTER TOO COOL!

Ted Morlock of Bricktown, NJ, scratch-built this beautiful, 21-pound, Sachs 3.2-powered Starduster Too biplane from Davis Birsighella plans and covered it with MonoKote. Under the cowl are a Slimline muffler and a B&B smoke system. Ted says that it looks great and flies well.



## COMMERCIAL CHAOS

This sorta city-hopper was built by William Iffert of Joshua Tree, CA, by kit bashing an Utter Chaos Twin. Bill cut 5 inches off the fuselage at the tail, stretched the front a couple of inches and built the flight deck and cabin area on top of the stock fuselage. With a reshaped tail, the twin-engine model looks totally different. Powered by two O.S. .45 FRS engines, the model is a real pleasure to fly and lands especially well. Bill says that this is his fourth twin, and he loves every flight.





## PRODUCT REVIEW

## Condor R/C Dyna Star



# Airborne alternator

by BOB GILBERT & RUSS PRIBANIC

*Although we flew this Florio Nifty 50 all day long and used many tanks of fuel, the receiver battery had a full charge at the end of the day.*

### Never worry about your battery's charge again!

WOULDN'T IT BE NICE if you could fly your model all day long and never worry about the battery for the receiver dying? That's just what you'll be able to do with the Condor R/C Specialties\* R/C Dyna Star AP-3 alternator/regulator unit. This easy-to-install, lightweight unit is driven by the model's engine by means of a rubber belt. It feeds your battery a constant supply of current, which will keep it fully charged as long as the engine runs. Judging from the supplied literature, the Dyna Star was designed for helicopter use, but we found that it was easy to set up in a fixed-wing model with just a little modification.

#### THE PACKAGE

The unit comes with a mounting bracket, a drive belt and a wire harness that's compatible with a Futaba\* or JR\* radio. There are instructions for using it with an Airtronics/Sanwa\* radio as well. The entire airborne package weighs 4.2 ounces, and its operating rpm range is 8,000 to 15,000rpm. Output voltage is 5.3 volts with a working power output range of between 3 and 5 watts. Although the system comes with

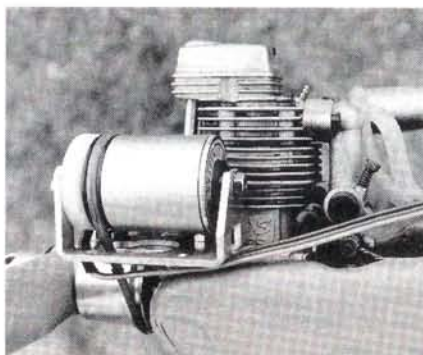
complete instructions that are geared for installation in helicopters, we decided to install it in an airplane. For the test aircraft, we used a modified Florio\* Nifty 50 that belongs to Russ's son, Justin.

#### SETUP

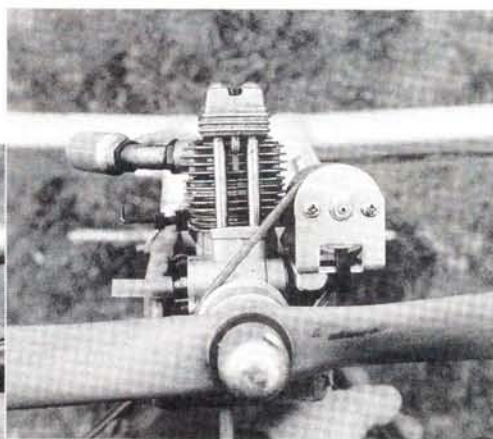
The Dyna Star unit has an unusual arrangement; the large, tubular, alternator housing rotates, and the smaller part of the assembly is fixed. Russ modified the unit with a new, thimble-shaped pulley and a groove that's slightly larger in diameter than the pulley that's supplied with the unit. This method works well with the slower-turning 4-stroke engine in the model. Many model engines already have a groove in their thrust washer, but if the

Dyna Star isn't modified before it's installed, the forward end of the alternator will interfere with the propeller.

We made a simple bracket to mount the alternator on the side of the engine; then the thrust-washer groove and the alternator's pulley groove were aligned. The bracket placed the alternator outside the contours of the fuselage; this installation was primarily for test purposes—not for show. We completed the installation by making a new belt. We cut the supplied belt to make it shorter, and then we soldered the ends together using an iron that had a flat, double-tapered



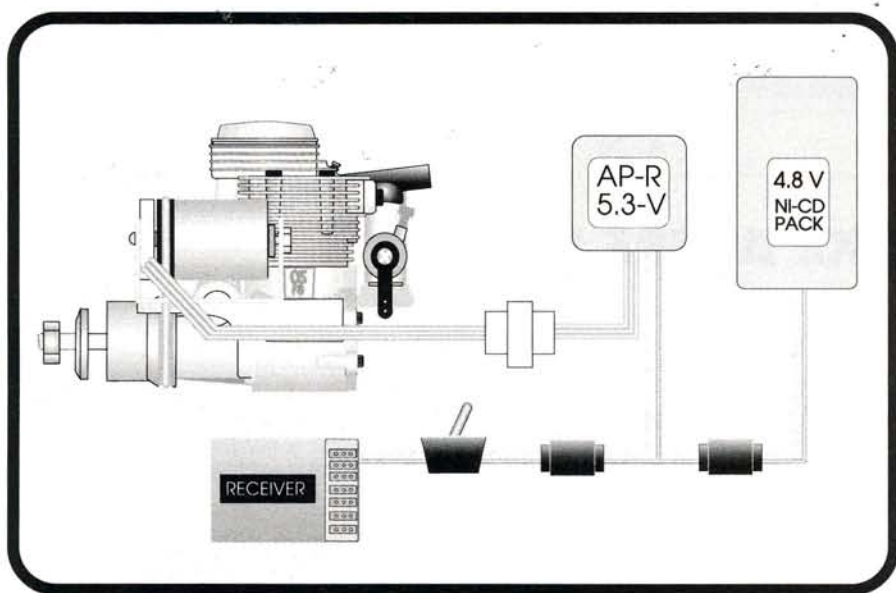
*The alternator is mounted on Justin Pribanic's model. The drive belt is made of an O-ring material, and it's driven by the engine's thrust washer that has a groove cut into it.*



*This front view shows the location of the unit relative to the engine. We modified the unit so the front of it would clear the prop by a safe distance. You can easily mount the unit in the cowl of a larger model.*

PHOTOS BY: RUSS PRIBANIC & TOM ATWOOD





*This shows the general arrangement of the AP-3 Airborne alternator. It's mounted on an O.S. .20 4-stroke engine.*

end. This procedure must be done with the belt in place. It took about three hours to make the parts and complete the installation, and it was well worth the effort.

### TEST FLIGHT

The tests we performed were quite simple. We attached a voltmeter to the battery leads and fired up the engine. Before we started the engine, the voltage was 5.03. As engine speed increased to more than 4,000rpm, the voltage climbed to 5.27 volts and held steady. Apparently, the regulator works well. Too much voltage would fry the battery and shorten its life substantially.

The usual engine-off, radio-range test was just fine, but when we started the engine and tested again, we found that the range was shorter, and it wasn't safe to fly. We called Condor R/C Specialties, and they suggested that we separate the receiver and voltage regulator by 3 or 4 inches. (They also told us that they had never experienced this problem.) We made the changes, and the range tests with the engine running and not running were both OK.

We started with a fully charged flight pack and a large 2500mAh transmitter battery. We flew the airplane all day, and whenever we checked the airborne battery pack, it was always fully charged. With this arrangement, flight duration is limited only by the onboard fuel supply and the duration of the transmitter battery.

The alternator can easily be positioned inside the cowl of a 1/4-scale model and can increase reliability—especially when the electrical load of larger servos is considered. The Dyna Star may even open the door to more realistic electric devices, such as scale, electrically operated landing gear. It's a nat-

ural for duration flights. We're completely satisfied with the Dyna Star AP-3; it's easy to operate, it keeps our battery pack charged, and it adds considerably to the safe operation of all R/C models.

### SPECIFICATIONS

**Operating rpm range:** 8,000 to 15,000rpm

**Output voltage:** 5.3 volts

**Power output:** 3 watts continuous; 5 watts surge

**Weight:** alternator—3.35 oz.; regulator—.85 oz.; total—4.2 oz.

**List price:** \$149

**Features:** the Dyna Star AP-3 can be used with any type of R/C model that has an engine. It can charge the airborne battery pack while also supplying power to the receiver/servos. The unit is driven by the engine by means of an O-ring belt. With the Dyna Star AP-3, you can use a smaller mAh battery pack, external charging of the flight pack isn't necessary, and flight times are limited only by the fuel supply and the size of the transmitter battery. The system prevents power drop-offs, which are caused by using many servos simultaneously. The unit starts to generate power at about 4,000rpm.

*\*Here are the addresses of the companies mentioned in this article:*

**Condor R/C Specialties**, 1733-G Monrovia Ave., Costa Mesa, CA 92627.

**Futaba Corp. of America**, 4 Studebaker, Irvine, CA 92718.

**JR Remote Control**; distributed by Horizon Hobby Distributors, 4105 Fieldstone Ave., Champaign IL 61821.

**Airtronics Inc.**, 11 Autry, Irvine, CA 92718.

**Florio Flyer Corp.**, P.O. Box 88, 149 Scotland St., Daguerre, PA 15831.

**O.S. Engines**; distributed by Great Planes Model Distributors. (See above.)

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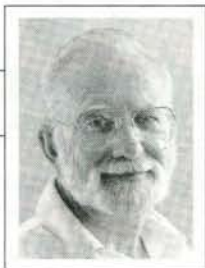
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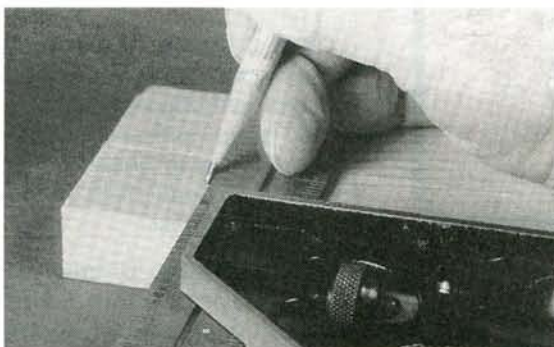


# How To:



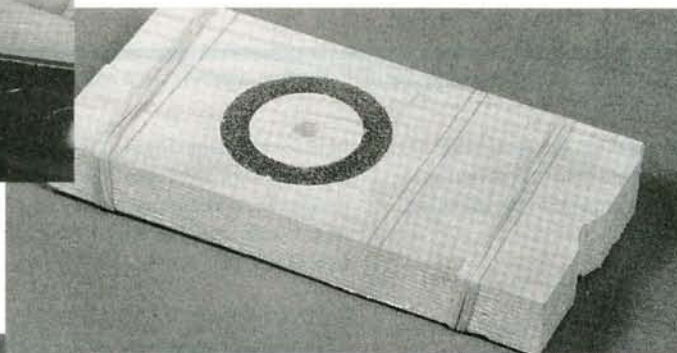
R A N D Y   R A N D O L P H

## MAKE A TIRE TOOL



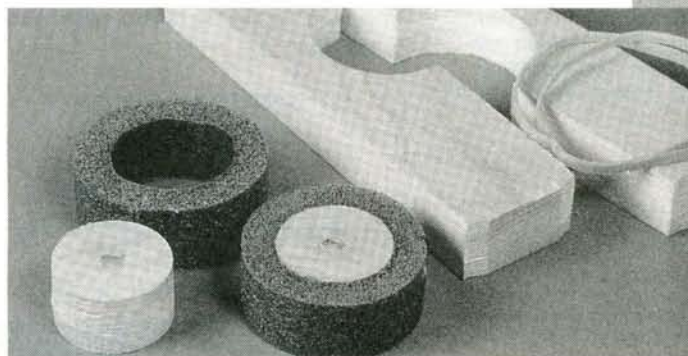
**1.** You'll need two, 6-inch pieces of 1x2-inch pine; a hole saw; and two rubber bands. Using C-clamps or the rubber bands, clamp the pieces of pine together side by side, and draw a line across both pieces. This will be used to align them later.

FOAM WATER-PIPE insulation makes a fine tire material for light wheels. The chief difficulty, though, is bonding the tire to the hub. Here's how to make a tool that will help you with this.



**2.** While the pine is still clamped, select a hole saw whose diameter is the same as that of the finished wheel (in this case, 2 inches), and cut a hole centered on the line where the two pieces meet.

**4.** Apply epoxy cement to the inside of the tire and to the outside of the hub. Place the tire and hub in one side of the pine tool. Fit the other side of the tool around the tire, and use rubber bands to hold the halves together. Use the line you drew to ensure that the two sides of the tool are aligned. Leave the wheel in the tool until the epoxy has set.



**3.** Cut the wheel hubs out of pine stock. Form the hubs using a 1½-inch hole saw. Epoxy a ¼-inch dowel in the center hole and drill it for the axle. Slice the tires out of 1-inch pipe insulation. Paint the hubs before you put the tires on.



**5.** When the epoxy has cured, insert a bolt through the axle hole, and secure it with a nut. Chuck the wheel in a drill, and while it's turning, shape the tire using coarse sandpaper. The sandpaper works best when backed by a block of wood.





# Stealth-E

by JEFF HOLAN

## Silent Assault

**I** DESIGNED THE STEALTH-E because I wanted a jet-style aircraft without the hassles that are associated with ducted fans. I was impressed with the performance and style of the planes at a local club's fan-fly, but I was discouraged by the gas, the noise, the glow plugs, the amount of fiddling and all of those starting probes and gadgets. It didn't look like fun, and some of the planes never did run right. I began to think about alternatives. How about an electric ducted fan? You just switch it on and throw it in the air! I already had my feet wet with electric planes, and I had a good idea of the sizes and weights needed for a flyable/fun plane.

Then the Gulf War started, and the new breed of high-tech weapons with surgical precision and deadly accuracy came to prime-time TV—Stealth technology! The F117A started the "stealth look," and the YF22 and the YF23 are nasty-looking fighters. I started sketching an electric ducted-fan Stealth. I read about the second Great Design Contest in *Model Airplane News*, and the race was on to design, build and fly this plane by the August deadline.

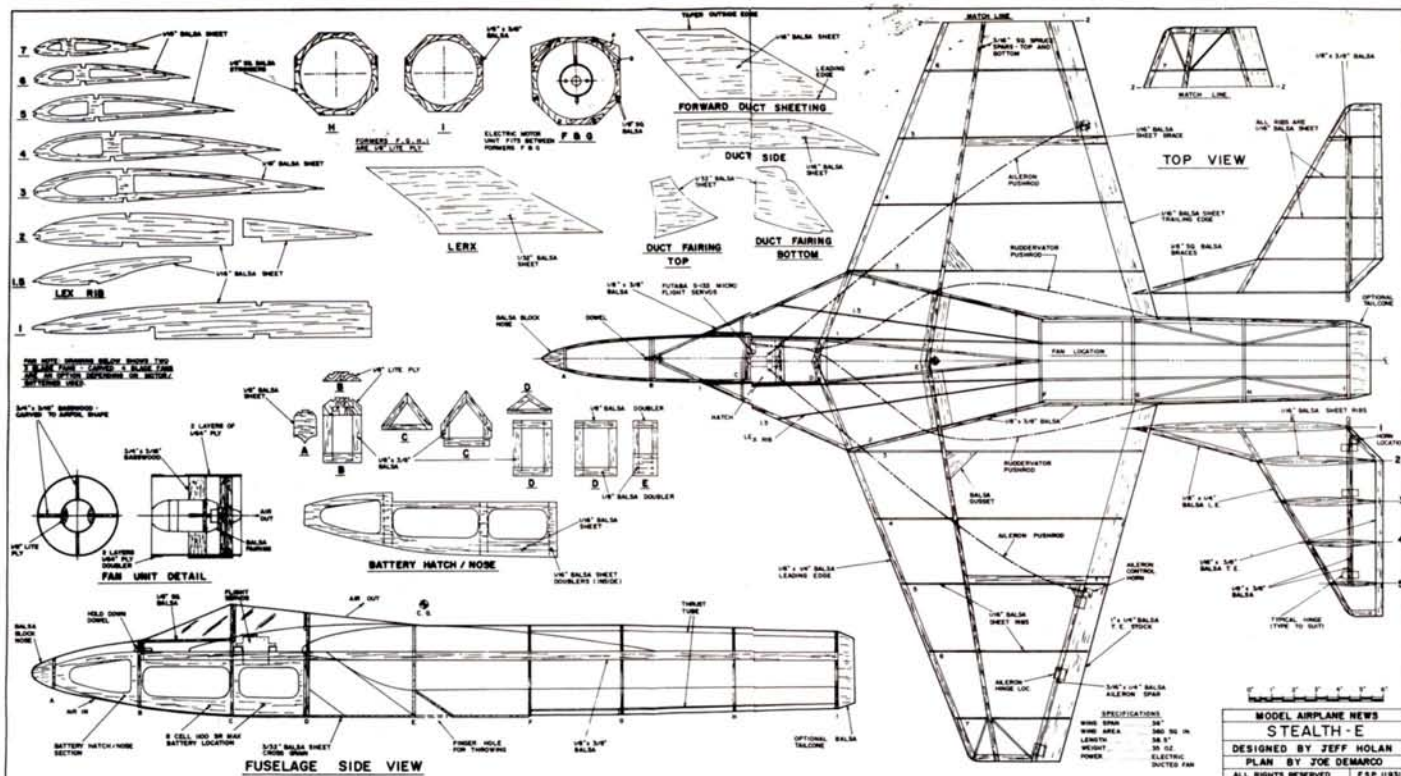
The Stealth-E prototype's first flight was like that of a powered paper airplane that didn't have enough power to sustain flight. (It demonstrated, however, a graceful, full-power,



**1** first place  
DESIGN  
CONTEST  
winner

PHOTOS BY JEFF HOLAN AND TOM ATWOOD





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FSP11931...\$10.

flare landing.) I discovered later that the single, three-blade fan developed more thrust with the access hatch removed, thereby producing a cheater inlet.

One week before the contest deadline, the prototype flew three successful "sorties." With my friend Tom at the sticks (I was a basket case), I ran, threw the plane and frantically grabbed my camera. With the increased thrust, the Stealth-E flew quite well and proved that

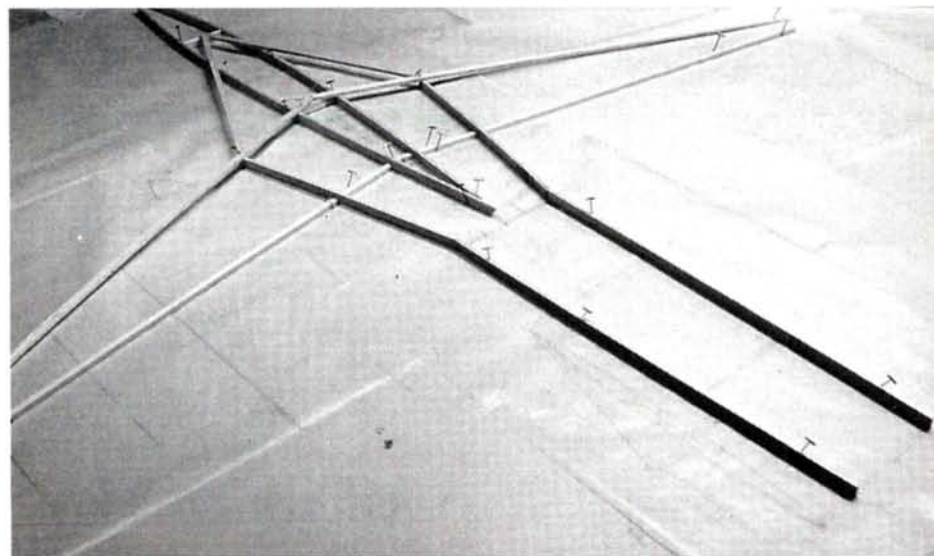
**Start building the plane by laying out the outline structure. The top and bottom fuselage structure is built around this frame. The longeron-like pieces on either side of the fuse are referred to in the article as the "fuselage spars."**

an electric ducted fan was possible. Tom did a great job keeping the plane circling around us so that I could get some flight shots to prove that this thing could really fly; we had a hard time believing it ourselves! Its flare for landing was a thing of beauty. It would just hang in the air—nose high—and bleed off speed until it floated onto the grass. A week or so later, I flew it for a fourth and fifth time. My landings weren't so graceful, and the abuse showed on the plane. I crunched the prototype on flight 5½ with a stall after a bad throw. The plane stopped on the ground, but the battery kept going. I picked up the remains and shelved them.

I decided to do some more research and make the necessary design changes on the plans but to wait to build another plane. I

didn't want to use any cheater holes in my design (they actually decrease top speed), so I made some changes to improve the intake volume and the airflow. I hadn't thought about how to hold the model to throw it; there wasn't a place to grab on to for a good throw. I slanted the intake duct edges toward the rear and added a finger hole. I fixed the structural (design) problems with the ruddervators and added the airfoil shape to them. To increase lift, I also changed the wing shape to an Eppler 197.

Good news: I won the design contest! Bad news: I have to build another plane and clean up my plans so that someone else can make some sense out of them. The plans are derived from the third version of the Stealth-E. It has the same profile and size as the prototype, but it flies much better. Experiments with different props ranged from single and double three-blades to the current four-blade. I used a plastic beer cup for a fan shroud in the prototype and a less than precise way to hold the motor inside it. The newer, rolled-plywood-tube fan unit is stronger, more efficient and makes motor timing a breeze. I added more performance by switching to SR 1100 Max batteries with Sermos\* connectors. The change increased the thrust 37 percent—from 8 to 11 ounces, and it decreased the weight by 1.5 ounces. I timed the motor for the highest rpm by turning the brush housing while the fan unit was running. Thrust is currently about 12 ounces, and the flight performance has improved greatly. If you build a Stealth-E, use light wood! Build it to fly—not to crash.





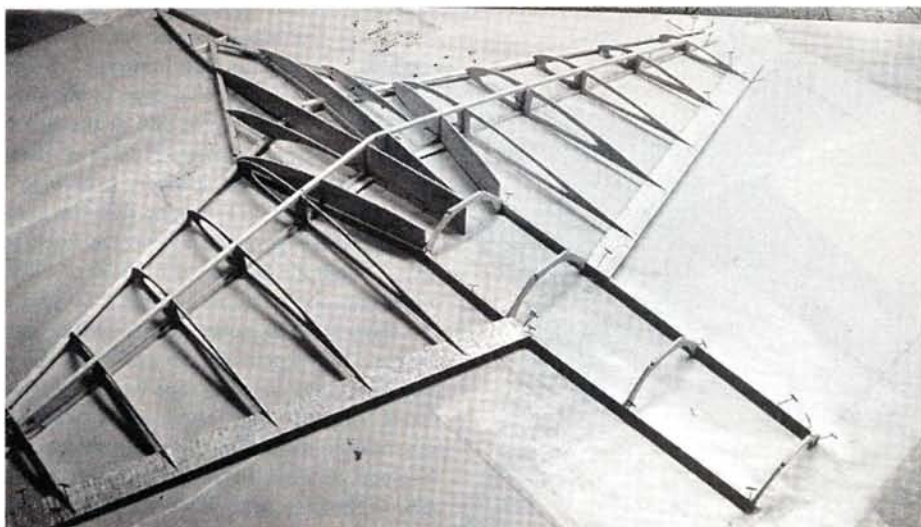
The one-piece upper fuse and main wing is taking shape.

## UPPER FUSELAGE/WING

Roll out the plans on a board, and cover them with wax paper. Pin down the  $\frac{3}{16}$ -square spruce wing spars and the  $\frac{1}{8} \times \frac{3}{8}$  balsa rear fuselage spars. Make duct spars and forward fuselage spars out of  $\frac{1}{8} \times \frac{3}{8}$  balsa and notch them to fit over the wing spars. Glue and pin them down, and add spar connectors at B and D. Add the  $\frac{1}{8} \times \frac{1}{4}$ -inch balsa leading edge to the wing and the root extension. Cut F, G, H and I out of  $\frac{1}{8}$ -inch light plywood, and glue them onto the fuselage spars. Cut out the trailing edge from  $\frac{1}{16}$ -inch balsa, and notch it where it connects to the G former. Cut out the ribs, and check for fit. You'll want to sand a knife-edge to the inside of the no. 1 ribs for a smooth exit into the fan. Make the stringers from the main spar to I out of  $\frac{1}{8}$ -inch-square balsa. Add  $\frac{1}{8}$ -inch-square balsa diagonal braces from F to G, G to H and H to I. Pull out your pins and remove the model from your board. Sand the leading edges of the wing and root extension, the main spar and the ribs where they contact the sheeting. Return the plane to the board, and pin it down over the plan. Remember to place the spacers under the wingtips and trailing edge. Glue and pin the  $\frac{1}{32}$ -inch top sheeting onto the wing from ribs 2 to 7. Use the pattern for the LERX and cut two out of  $\frac{1}{32}$  sheet. Sand a knife-edge on the bottom of the LERX where it overlaps the wing sheeting at rib 2. The sheeting will be much easier to bend and glue if you wet the top of it with water and let it sit for a few minutes. Glue  $\frac{1}{32}$ -inch sheeting between F and G. Complete the sheeting by connecting the main spar at E and back to F. Sheet the remaining triangles between the LERX and the main spar.

## RUDDERVATORS

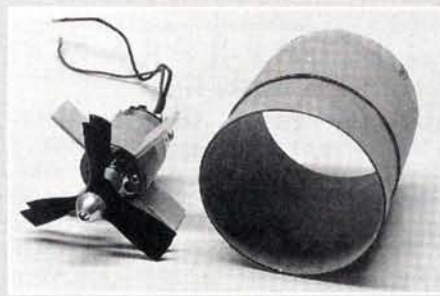
The ruddervators (vee-tail setup) are made out of strips of  $\frac{1}{16}$  balsa and  $\frac{1}{8} \times \frac{3}{8}$  balsa spars at the hinge lines. You can save time by making two of everything and building both sides simultaneously. Cut the hinge line spars to length, and pin them down on the plan. Cut out ribs 3 through 5 from a strip of  $\frac{1}{16} \times \frac{3}{8}$  balsa. Put the leading edges together, and cut a  $\frac{1}{8} \times \frac{5}{16}$  notch for the leading-edge spar. Repeat this process for the trailing edges, but make the notch  $\frac{1}{16} \times \frac{3}{8}$ . Ribs 1 and 2 are made out of  $\frac{1}{16} \times \frac{1}{2}$  balsa. The notches are different sizes because of the angles, so use the pattern on the plan. Set them all in place over the plan and make sure you have a good fit at the  $\frac{1}{8} \times \frac{1}{4}$  leading edge, the  $\frac{1}{16} \times \frac{3}{8}$  trailing edge and the tip. I left the leading edge in one piece and cut it later after I sanded the ribs to an airfoil profile. When you're satisfied with the fit, glue the



## Scratch Build A Fan Unit

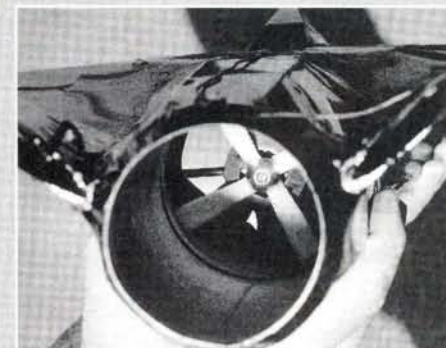
**C**ut out a 4-inch-wide piece of  $\frac{1}{64}$  ply, and wrap it around a 3½-inch-diameter form. (I used a plastic peanut butter jar.) Put a couple of rubber bands around the tube to hold the ply in place. Wrap a 2½-inch-wide strip of  $\frac{1}{64}$  ply around the rear edge of the fan unit, and roll a couple of rubber bands over it to hold it in position. Repeat this process with a piece that's 2½ inches wide and another that's 2 inches wide. Perform this procedure using ½-inch-wide strips for the intake side. Cut out a 1¼ strip of  $\frac{1}{64}$  ply that's long enough to wrap around your electric motor twice. Glue it while holding it in place with rubber bands. When it's dry, remove the tube and set it over the front view on the plan. Cut out the stators ("mounting fins") from ½ lite-ply (or  $\frac{3}{16}$ -inch basswood), and sand the edges to shape. Glue the stators to the motor tube at the positions shown on the plan, using a triangle to keep them square. Add ½ ply motor mounts to the inside of the motor tube as shown on the plan. Measure and drill the mounting holes to fit the motor.

To make your prop/fan, you can either use two- or three-blade props stacked on one another, or make a four-blade prop. [Editor's note: *Model Airplane News* does not endorse re-engineering or modifying commercially available propellers.]

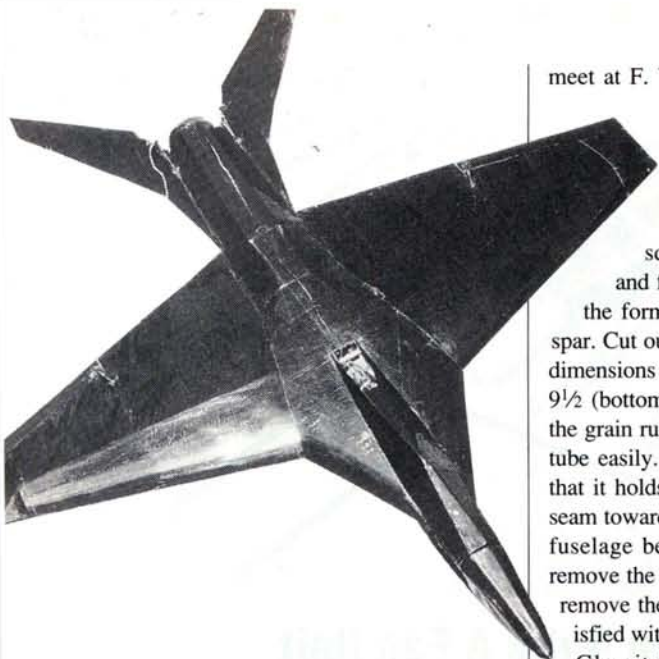


The double three-blade is easier, but the four-blade seems to create more thrust. Take two 5½x4 props and cut off the tips so that they have a  $\frac{3}{16}$  inch diameter. I cut them a little longer so they can be fitted to the fan tube at final assembly. Fit the fan-to-shroud clearance by trial-fitting the motor/stator assembly in the fan tube. Gradually, reduce the diameter of the fan blades by spinning the motor and shaving off small amounts of the fan against a sanding block. The clearance between the blade tips and the fan should be as small as possible for maximum efficiency. The clearance must be wide enough so that the blades don't touch the tube at higher rpm, i.e., owing to blade stretch/distortion.

After the final assembly and the initial full-power runs, they'll "buzz themselves down" to the final length. The stators should be sanded so that they fully contact the fan-tube walls without distorting the tube. Spin the prop, and adjust the unit as necessary to achieve equal tip clearance around the entire tube's circumference. Tack-glue the motor/stator assembly into position 1½ inches from the rear edge. When it's set, add fillets of glue around the joints to strengthen and streamline them. Drop the fan unit into the fuselage and align its rear perimeter with the front of the thrust tube, and its front with the intake-duct walls. Glue the spruce-spar mounting rails to the tube exterior so that the fan can be bolt-mounted to the fuselage spars.







ribs, leading edge and trailing pieces together per the plan. Sand the ribs to an airfoil shape as shown on the plan, and then cut the leading edge just inside rib 5 so that rib 5 can pivot with the ruddervator after the installation of the subspar and the ruddervator leading edge. Sand the hinge-line spars to the shape on the plan.

### LOWER FUSELAGE

Make formers B, C, D and E out of  $\frac{1}{8} \times \frac{3}{8}$  balsa as shown on the plans. Cut A out of a solid piece of  $\frac{1}{8}$  balsa. Make formers F, G, H and I out of  $\frac{1}{8}$  light plywood. Flip the plane onto its back and glue formers D2, E, F, G, H and I (make sure that they're perpendicular to the fuselage spars). Cut out a piece of  $\frac{1}{16}$  balsa to measure  $2\frac{1}{2} \times 10\frac{1}{4}$  for the inner walls of the intake duct. Sand a knife-edge where the two

meet at F. You'll have to put a notch in the rear bottom corner where it meets F. Glue it to formers D, E and F, on the bottom to the fuselage spar, and at the notch where it meets F. Glue  $\frac{1}{8}$ -inch-square balsa stringers from E to I and from F to I, making sure you keep the formers perpendicular to the fuselage spar. Cut out the thrust tube from  $\frac{1}{4}$  ply. The dimensions for the thrust tube are  $11\frac{1}{4}$  (top)  $\times$   $9\frac{1}{2}$  (bottom)  $\times$  10 inches (length). Make sure the grain runs lengthwise, so it will roll into a tube easily. Put masking tape on the ends so that it holds its shape, and insert it (with the seam toward the bottom of the plane), into the fuselage between formers G, H and I, and remove the tape. After you've checked for fit, remove the tube and sand it until you're satisfied with the fit.

Glue it in place using clamps and pins where necessary. Cut off the extra ply on the thrust tube, and sand it smooth with the former ends. Sand the inside edge of F to fit the  $\frac{1}{32}$  balsa intake sheeting. Follow the patterns on the plans for the top and bottom, make two of each and glue them into place. Add duct walls from D to E. Sand the forward edge of the duct spar to match the profile of ribs 2 and 3. Clean up the intake as much as possible by sanding any rough edges and filling any seams before adding the  $\frac{1}{16}$  forward duct sheeting. Add the triangle-stock, leading-edge reinforcements to the duct sheeting, and sand the intake opening to a smooth bell-mouth shape.

### BATTERY HATCH/NOSE

Cut out the nose profile from  $\frac{1}{16}$  balsa and lay it over the plan. Add  $\frac{1}{16}$  balsa doublers



### SPECIFICATIONS

**TYPE:** Electric ducted fan/sport.  
**WINGSPAN:** 36 in.  
**WING AREA:** 360 sq. in.  
**WING LOADING:** 14 oz. per sq. ft.  
**LENGTH:** 38.5 in.  
**WEIGHT:** 35 oz.  
**MOTOR:** .05 electric, 12-turn quad, ball bearings, wet magnets and advanced timing  
**FAN/PROP:** 3.5-in. diameter four-blade (or double three-blade)  
**BATTERIES:** 8 SR 1100 Max  
**CONTROLS:** aileron, elevators and speed controller  
**CONSTRUCTION:** all balsa and light plywood with iron-on covering

(remember to make a right and a left side). With the right side on the plan, tack-glue on the left side of formers D1 and B1, and put into position on the plane. Pin them in place, and add formers C and A. When you're satisfied, run a bead of glue around all the joints, but be careful not to glue this assembly to the fuselage spar. Add the  $\frac{3}{32}$  sheeting to the bottom of the hatch with the grain running sideways (not lengthwise).

### RADIO INSTALLATION/FINAL ASSEMBLY

Install your radio equipment as shown. The radio and the speed controller may be posi-

## FLIGHT PERFORMANCE

by David Baron

#### • Test flight

The model tends to lose altitude slightly after release, so launching it off a small rise may give you some insurance. Allow the model to fly level for a few seconds to gain speed before you attempt a climb. It doesn't accelerate quickly, so be patient. The model is very stable throughout the launch, but the controls will get mushy if you ask it to climb before it's ready. It doesn't show tendencies to stall violently or snap roll.

#### • Launching/takeoff/climb-out

I don't recommend that the pilot hand-launch this model. It needs a first-rate hand toss, and I think having the transmitter in one hand and the plane in the other invites disaster.

#### • Low-speed stalls

As with any jet, this plane lacks a surplus of wing area, and as with any

electric, it carries a load of batteries. Both of these factors raise the wing loading, and while they don't necessarily change the stall speed, they do affect how much altitude is lost when a stall occurs. Owing to its length, the model has a very predictable stall that falls almost straight ahead. Expect to lose altitude and you won't have any other surprises. Strive to maintain air speed throughout the flight, and you'll be rewarded with increased duration.

#### • High-speed stalls

The model will begin to mush if you ask it to perform a loop or a hairpin turn that's too tight at full speed. This may be eliminated by reducing the elevator throw, but it would have an adverse effect on the model's aerobatic performance.

#### • Speed range

I'm not knocking the designer's

accomplishment (which is nothing short of incredible), but it would fly much faster if there were 10 more mph of thrust through the fan unit. This would be a fertile area for enterprising scratch builders to explore, whether with alternative glow or electric power systems. If you are a speed demon, this may be the ticket.

#### • Low-speed control sensitivity

The model descends rather quickly, but it's predictable in the controls. Remember to save a little air speed for your flare, and you'll be pleased by the speed with which it touches down.

#### • Aerobatics

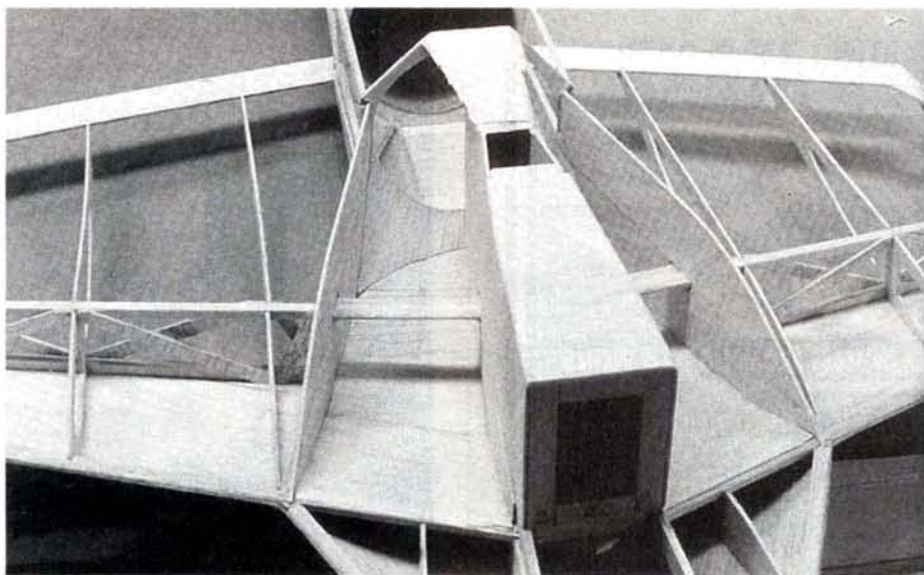
Rolling maneuvers are a cinch, but you'll lose altitude if you don't maintain air speed. Looping maneuvers are less than perfect, but they're easily accomplished with ample speed

and altitude. Keep in mind just how revolutionary this design is, and it will produce awe by just taking to the air.

#### • Overall characteristics

The Stealth-E turns heads and gains acceptance by all who see it. Its docile flight characteristics are the icing on the cake. Remember that anything you do to reduce vibration will go a long way toward maximizing the motor rpm. Be especially fanatical about how you balance the propeller, and be sure you run it before installation. Vibration reduces both thrust and duration, so it's worth the time to get it right. The Stealth-E features a superb collection of ideas for weight reduction and airflow around critical components of the radio and power system. Its design and efficiency is brilliant. Flights are short, but you must keep in mind the power system efficiencies.

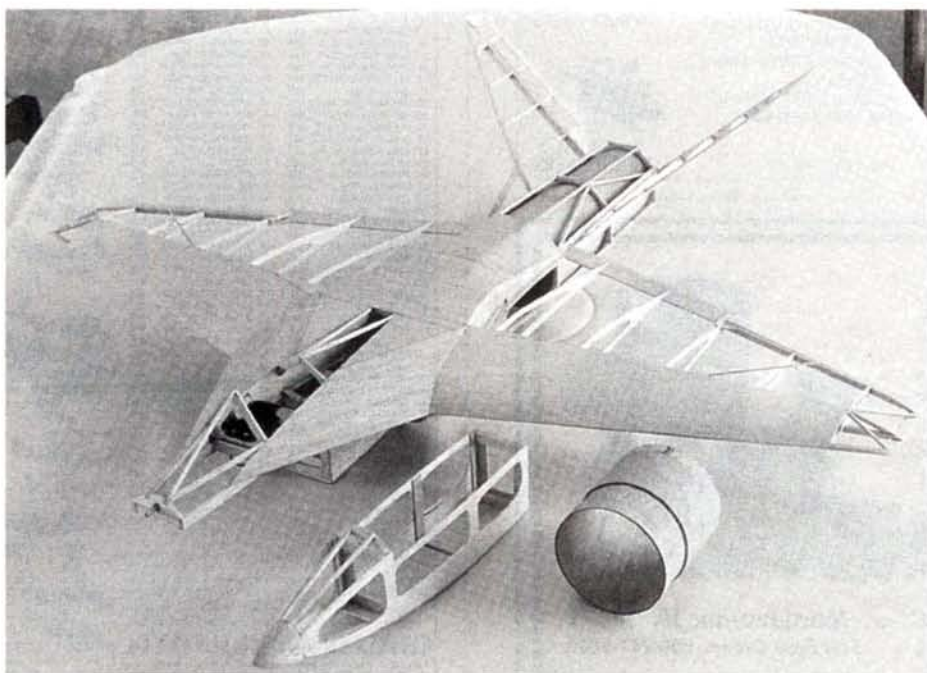




*This view of the inverted plane's front end shows the inside of the ducts before the fuse bottom has been put into place. The battery compartment/nose is not shown.*

tioned in the canopy area. Use small cable-type pushrods for control-surface actuation. Be sure to glue them to the structure every couple of inches, because they're flexible and can flap around. Solder the ends of the cables to stiffen them. I set the aileron throws at  $\frac{5}{16}$  inch up and  $\frac{1}{4}$  inch down. Use two pushrods for ruddervator control. Solder them together at the servo end so they'll move together. A throw of  $\frac{5}{16}$  (up and down) seemed to give enough throw to loop and fly while the plane's inverted without being too sensitive. Add  $\frac{1}{16} \times \frac{1}{4}$  strips around the perimeter of the wing and the ruddervators where they con-

*This photo of the completed skeleton shows the battery compartment/nose separated from the front of the ship. The fan-unit tube is also shown.*



nect to the fuselage so the covering has something to grab onto.

### FLYING

If you jumped right to this section, good for you! I built this plane to fly, and fly it does. You can go the field and have a couple of flights before anyone even has his plane gassed up and started! On its first flight, have a buddy throw the Stealth-E for you. For the best launch, throw it from a five- or six-step running start level and into the wind. We came up with a countdown: the "Stealth-Chucker" counts down from five as he starts to run. At three, start applying throttle, and he throws it on one. As with any ducted fan, you should let it build up some speed before climbing out and circling back across the field. After you get it trimmed and get acquainted with it, you'll be able to launch it yourself. The Stealth-E will climb out very



*The battery compartment/nose has been removed. A small dowel is inserted into a hole in the back face of the removable nose, and a small Carl Goldberg\* hatch lock locks the rearmost piece of the battery compartment to the fuselage with a sideways movement of the compartment. A hard landing will dislodge the battery compartment without damaging the plane.*

well from a good launch; I've been able to launch it, climb out and split-S into a low flyby without circling for altitude. Rolls, Immelmans and loops are all possible, but you must maintain air speed. I usually dive before a maneuver to gain speed and because the Stealth-E sounds so mean screaming by at an unbelievable rpm. Most people who have seen it fly say they like the way it sounds (as if it's a "hair dryer with an attitude.") Be sure to check out the slow speeds at which the Stealth-E can fly before you land. It flares very nicely and doesn't tend to tip stall. Land on grass to avoid scraping the belly. Throttle back and bring it in. Flight times last about  $2\frac{3}{4}$  minutes at full throttle, and they still leave enough juice for a short landing approach.

### SPECIAL THANKS

Getting the Stealth-E off the board and into the air wouldn't have been possible without help. I'd like to thank my wife, Heidi, who puts up with my hobby and me; my flying buddies—Earl Ludeke (the "Stealth-Chucker") and Tom Kandel (the test pilot)—who helped me with flight testing; and John Seger, who took many photos. I'd also like to mention Larry Sribnick of SR Batteries\* and John Sermos of Sermos R/C Snap Connectors who were very helpful and whose products have performed well in the Stealth-E.

\* Here are the addresses of the companies mentioned in this article:  
Sermos R/C Snap Connectors, Cedar Corners Station, Box 16787, Stamford, CT 06905.  
SR Batteries Inc., Box 287, Bellport, NY 11713.  
Carl Goldberg Models, 4734 W. Chicago Ave., Chicago, IL 60651.





Launches at the start of the heat races.



Manny Tao shows the Modi 900 bird he flew. This all-molded aircraft is available from Greco Models.



# International Slope

## High-speed competition on the cliffs

by MIKE LEE

ONLY A few years back, very few sailplane pilots were slope soarers. Today, almost every pilot either has a slope bird, or has flown one, and slope racing is popular worldwide. Now we have hot competition on the slopes—pylon racing.

The usual Formula 1 and Quarter Midget pylon racing is pretty hairy, but when you add a sheer cliff to the race, you have an event that requires nerves of steel. Whistling along at 60mph just inches off the cliff is not for the weak of heart.

### THE SITE

Held on May 1 and 2 at the famous Torrey Pines glider port in San Diego, CA, the International Slope Race saw more than 35 pilots duke it out for top pylon honors. At least two were from outside the U.S., though they didn't come here specifically for it. The host club, the Torrey Pines Gulls, put on a first-rate event—two awesome days of non-powered speed.

We expected to see some pretty hybrid machines, but many pilots chose to use standard F3B-type aircraft that were heavily ballasted for speed. The next most popular aircraft were smaller, slope aerobatic aircraft.

Conditions on the slope weren't ideal: Saturday's light, 8 to 10mph, wind gusted to 12mph. In San Diego, this is very unusual for May, but the area had also had the wettest winter for 80 years. It was workable, however, and the first flights got off by noon.

The air space over the treacherous, 350-foot Torrey Pines cliffs is shared by modelers, hang gliders, full-size gliders and parasailers. For full-scale slope soaring, only expert pilots are allowed to fly there. The cliff's jagged profile causes wind shears and dead space that require skill to negotiate. In pylon racing, the ships fly along the face of the cliff for a grueling eight laps.

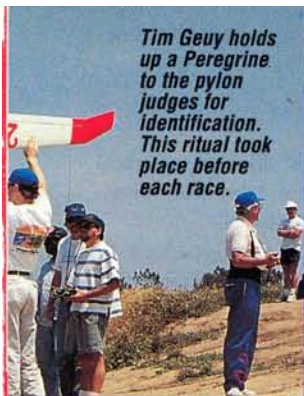
Seven rounds were scheduled, and the Torrey Pine Gulls had laid out a

Action at the far turn shows aircraft rounding the pylon, and the turn lights can be seen in the lower right corner.

PHOTOS BY MIKE LEE



Tim Geuy holds up a Peregrine to the pylon judges for identification. This ritual took place before each race.



The midair! Frame A: Ken Stone and Scott Tooher find each other in midair in this spectacular sequence. Frame 1 was taken milliseconds after impact. Note that the wingtip has been sheared away, but the bird is still climbing. Frame B shows the two ships with tails tangled heading for the cliffs. Frame C shows both birds, mortally wounded and headed for the end of the ride.

# Race at Torrey Pines



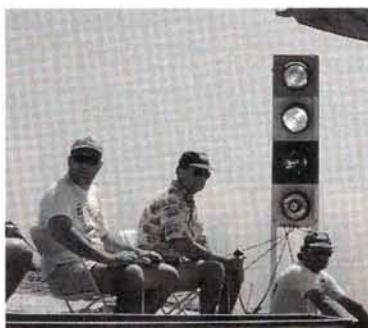
The top 10 pilots show their awards: (rear from left) Tim Geuy—10th; Aaron Valdez—9th; Imrose Kahn—8th; Duane Gibbs—7th; Tim Neja—6th. Front row from left: Charlie Richardson—5th; Paul Naton—4th; Gavin Botha—3rd; Thomas Pils—2nd; Jerry Bridgeman—1st.





## INTERNATIONAL SLOPE SOARING

800-foot race course (one way). In the past, a flagman dropped a colored flag to tell pilots they had reached the far pylon. Now, high-intensity, four-color lights tell which aircraft has reached the turn, and the "flagman" only punches a button when the aircraft turns. Communication between the pylon judges and the contest director was maintained by means of walkie-talkies.



*Above: these high-intensity lights signaled a pilot when his aircraft reached the turn pylon. This modern method is faster and more reliable than using hand-held flags.*

*Left: Paul Naton identifies his small Renegade for the pylon judges before the start. Paul took fourth against the F3B birds that were more than twice as big.*

their aircraft to mix the flaps (or flaperons) with the elevator for a lifting-turn effect. Pull on the elevator while dropping the flaps slightly, and the aircraft almost ricochets out of the turn.

The fastest way to corner was to roll just past 90 degrees of bank and allow the bird to fall through the turn. You could maintain, or even gain speed with this method. A standard, 90-degree flat turn was OK, but you certainly found out

how far behind you were when someone did a "slingshot turn" beneath you.

smaller, slope, aerobatic ships put on a real show, flying only inches away from disaster, but never hitting the slopes.

A new combination of pilots flew in each heat. Consequently, we were treated to the exciting sight of 115-inch-plus birds of F3B design being hounded by smaller slope fighters—like the thrill of seeing a large bomber being jumped by fighter aircraft in combat. The dedicated slope racers were slightly out of their element, because the light winds provided only marginal conditions for their 7-pound airframes.

### SCORING

Scoring wasn't traditional. The winner of a heat was granted 1,000 points. His time was recorded, and the rest of the pilots were awarded points according to how much longer they took to complete the course. For example: if you took 100 seconds to finish and win your heat, you received 1,000 points, and a pilot 10 seconds behind you was awarded 900 points because he took 10 percent longer to finish.

Saturday saw four rounds—great flying and a chance to see the laws of physics at work. Our first lesson involved the theory about what happens when two bodies try to occupy the same space at the same time. Check out our rare photo sequence—a midair in progress; it proves the theory. Lesson two was about loss of lift. If an aircraft increases its angle of attack to a point at which airflow over the wing is interrupted, a stall will occur at high speed. We saw several examples.

Sunday greeted us with very marginal conditions—a fog and winds that were so light they were often indiscernible. Nevertheless, the first flights got off at noon, and the F3B-type aircraft had a decided edge. Pilots heading for the launch site were seen to have ballast in hand, so when the wind kicked up, they were prepared to add weight. Some birds met the contest's specified maximum wing loading of 24.5 ounces per square foot. Meaning that some weighed as much as 10 pounds! Four pilots—Jerry Bridgeman, Thomas Pils, Gavin Botha and Paul Naton—won every heat they entered. Paul was the only one to reach the top of the heap with a smaller, slope, aerobatic bird; the others flew F3B birds. Only sixth-place Tim Neja was able to get one of the truly dedicated slope racing aircraft into the top 10.

## WINNERS

Pos.	Pilot	Plane	Mfr.	Wing Area	Weight (oz.)	Airfoil
1.....	Jerry Bridgeman.....	Murphy.....	Scratch.....	1,050.....	115 - 176.....	RG-15
2.....	Thomas Pils.....	Slope Eagle.....	Scratch.....	835.....	14.5 - 22.5.....	96-160
3.....	Gavin Botha.....	Cobra.....	Scratch.....	NA.....	105.....	2055
4.....	Paul Naton.....	Renegade.....	CR Aircraft.....	420.....	38.....	RG-15
5.....	Charlie Richardson.....	Renegade.....	CR Aircraft.....	420.....	35.....	RG-15

### LAUNCHING A RACE

The start of a slope pylon event is something like the rolling start of a car race. The aircraft are launched one at a time, and one minute is allowed to reach the starting position. Before the start, you can go anywhere you want and as high as you like. The bigger F3B types will drop their flaps slightly and climb quickly to maximum height. About 7 seconds before the start, they peel off in a descending spiral dive for the starting gate. The smaller slope aircraft also climb high, but with 5 seconds left, they simply roll over into a screaming dive for the gate. I estimate that, at the start, the speeds of some aircraft reached 100mph.

As in car racing, most pylon races are won in the corners—not necessarily the straights—so getting through a corner quickly is important. Most pilots set up

On the way to the next pylon, altitude was gained for another falling turn.

The actual flying was something to behold. The F3B-type ships had to stay about 20 to 30 feet away from the cliff. The



*The top three winners: (from left) Gavin Botha, Thomas Pils and Jerry Bridgeman.*



## CENTER ON LIFT

a straight replacement. The end cap requires you to remove the brushes from the old piece and put them into the new brush holders and springs. You can even adjust the brush timing to try to get more power. Doug sells these pieces for \$99 (plus \$7.75 S&H).

### TURNAROUNDS

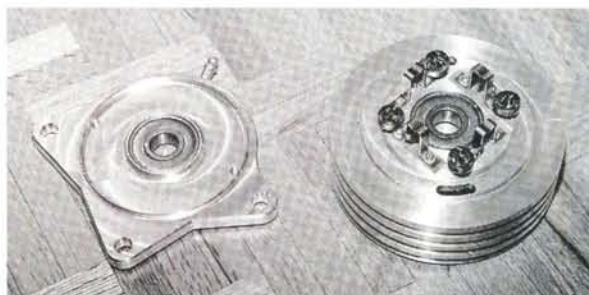
A slick, lightweight, easy-to-set-up turnaround is available from Timbs Engineering\*. It has a large-diameter pulley. Small pulleys or bicycle hubs spin very rapidly during launch and continue to spin at the end of the launch; this can be rough on some types of winch line. The large, lightweight pulley in the Timbs turnaround has none of these flaws. It is mounted between two aluminum castings and bolted onto a plywood base. When turnarounds are mounted on a stake, the line can wrap around it. There are no parts on the Timbs turnaround where the line can snag. Setup is quick, too. You won't need a large hammer to pound the turnaround

into the ground. Three stakes driven at an angle through the base hold the turnaround securely on the ground.

### NSP CATALOGUE

The latest Northeast Sailplane Products catalogue has been out for a few months. (If you don't have a copy, contact Sal at NSP.) This year's catalogue is double the size of last year's, and it's still the same price—\$5. Double the size means more sailplanes and accessories. A new electric section is included for those who prefer electric motors for launching.

In between all the product listings is a wealth of sailplane information. There are tips from many of NSP's customers and 30 new articles. To help you find information, NSP added a product index. I think it's great that we have so many choices—many from small companies



*Replacement parts for Ford long-shaft starter motors include ball bearings and a heat sink.*

run by fellow modelers. Thanks to NSP, it's easy to find them.

*\*Here are the addresses of the companies mentioned in this article:*

**Northeast Sailplane Products**, 16 Kirby Ln., Williston, VT 05495; (802) 658-9482.

**Douglass Boyd**, 29918 SE Davis Rd., Estacada, OR 97023.

**Timbs Engineering**, 1672 Los Osos Valley Rd., Los Osos, CA 93402-3004.

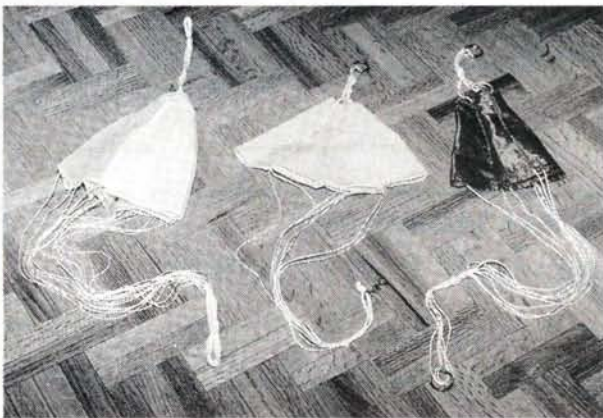
**Soaring Stuff**, 9140 Guadalupe Trl. NW, Albuquerque, NM 87114.

**Wayne Fredette**, 17841 67th Ave., Tinely Park, IL 60477.

**The White Company**, 122 Spring View Pl., Sequim, WA 98382-2893. ■

## PARACHUTES

**Y**ou need a good parachute for any towing system—high-start, winch, or hand tow. Use a large parachute for high starts, a medium one for winch launches and a small one for hand tow. I prefer a good welded tow ring. Even though split rings are cheap and easy to find, they are only good for smaller high starts. These rings bend and come apart on winches. You should



*Parachutes (left to right): the White Company\* "Champion" model; Wayne Fredette's\* chute with welded ring and swivel; and the low-cost chute from Soaring Stuff\*.*

replace your tow rings if they become bent and check them carefully if they are run through turnarounds. Attach the parachute to the winch line with a strong swivel. This lets the chute rotate without twisting the tow line.

The photo displays three of the many chutes available. They are strong and can take some abuse. The least expensive chute is from Soaring Stuff\* and comes with two split rings. Remember to solder the split rings if you use the chute on a winch.

My pick for best value is the chute from Wayne Fredette\*. This includes a strong welded tow ring and an excellent swivel.

If you want all the bells and whistles, look at the chute from Jim White of The White Company\*. His top-of-the-line "Champion" chute comes with 16 shroud lines instead of eight, and netting on the top lines to prevent the tow ring from tangling in them. The shroud lines fold the chute tightly during launch, and it always opens after release. Jim offers some more conventional, less expensive chutes in a great selection of colors.





MIDWEST

# Cherokee.40

by JIM ONORATO

**Stability with a touch of class**



**W**HEN PRODUCTION OF the first Piper Cherokee began in 1961, no one knew that Piper was laying the foundation of what would become a classic light plane. In the next 30 years, this simple, all-metal, low-wing trainer was the first of more than 36,000 Cherokees. Prized for its stability and great flying characteristics, the Cherokee set the pace for many years, and even today, I understand it's a delight to own and fly.

Since full scale is a little out of my league, I was delighted to be given the opportunity to build and review Midwest's\* semi-scale model of this classic trainer. Besides, I've had an affinity for Cherokees ever since I built the first of two VK Cherokee Babs more than 20 years ago. The Babe was my first low-wing trainer, and it has given me many hours of flying pleasure over the years. In fact, although it's a little shopworn, it's

still in flying condition. (I built and sold the second while I was living in Brazil.) I was really looking forward to building my third and largest Cherokee.



PHOTOS BY JIM ONORATO & WALTER SIDAS





*The large crystal-clear canopy and cockpit "floor" really add to the Cherokee's scale appeal.*

The Cherokee .40 is one of Midwest's Success Series, which includes kits for several warbirds, trainers and, more recently, a Sukhoi .40. These kits feature complete, fully illustrated, step-by-step construction manuals and full-size plans that ensure success.

### THE KIT

Wooden parts are packed in numbered plastic bags by sub-assembly (fuselage, wing, etc.). Hardware is also packed in separate bags for each sub-assembly. "Kit Contents" offers a complete description of all the parts, and the instructions give the part sizes. The 92-page instruction manual describes 284 building steps. It's obvious that Midwest put a lot of thought into making this kit "builder friendly."

### CONSTRUCTION

I used Satellite City's\* Hot Stuff, Super T and Kick It accelerator for most of the construction. These high-quality products make building fast and easy. I used 5-minute epoxy on the firewall and landing-gear blocks.

### WING

The constant-chord wing on this model has a semisymmetrical airfoil. It's built up with die-cut balsa ribs, two spruce spars and  $\frac{3}{32}$ -inch-thick balsa leading-edge and center sheeting. A simple building jig is provided so the wing can be built on a flat surface. Strip ailerons come beveled, and the wingtips have been machine-sanded.

The wing halves are joined without dihedral braces but are strengthened at the center with 3-inch-wide fiberglass tape affixed with Hot Stuff. The plans call for 4 to 5 inches of dihedral; I decided on 4 inches, but if this is your first low-wing endeavor, you should go with 5 inches.

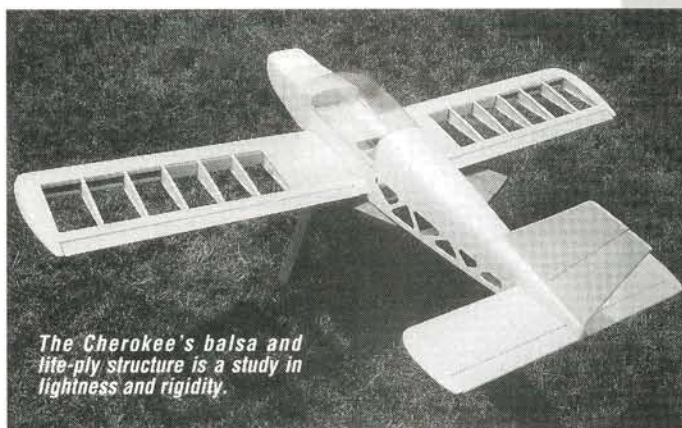
### FUSELAGE

The fuselage is constructed mostly of die-cut Micro-Lite\* plywood. The die-cutting is excellent, and the parts fit perfectly. To ensure good bonding with Hot Stuff and Super T, I lightly sanded the edges of all the parts. The fuselage is assembled as a box; its sides, top, bottom and

formers interlock to form a strong, straight rigid structure. For additional strength, I installed  $\frac{1}{4}$ -inch triangle stock behind the firewall.

The turtle deck and forward deck are constructed of Micro-Lite plywood formers, spruce stringers and  $\frac{3}{32}$ -inch-thick balsa sheeting.

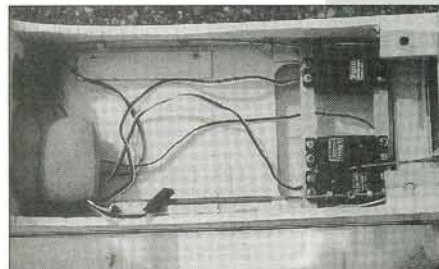
The throttle, elevator and rudder/nose-wheel servos are mounted on  $\frac{1}{4} \times \frac{3}{8}$ -inch spruce rails that are glued to  $\frac{1}{2}$ -inch-square balsa blocks attached to the top of the fuselage box. After I had installed the wing, I found that the elevator



servo interfered with the aileron pushrods. (The plans don't include a top view or cross sections of the fuselage. A top view might have shown the potential for interference.) I corrected this by replacing the  $\frac{1}{2}$ -inch-square balsa blocks with  $\frac{1}{4} \times \frac{1}{2}$ -inch stock, and this raised the servos by  $\frac{1}{4}$  inch. The bottoms of the servos extend into the cabin, but they're easily concealed with a simple balsa box, which I painted flat black. Another way to correct the interference would be to position the aileron servo and torque rods off center so that the pushrods are between the elevator and rudder servos.

The instruction manual shows both side-mounted and upright engine installations. To be different, I mounted my engine at a 45-degree angle. I use an O.S.\* .46 SF with stock muffler swinging an 11x8 APC\* prop.

The cowl is ABS plastic molded in two pieces—front



*The wide radio compartment is somewhat shallow, so you must ensure that the tops of the servos in the fuselage don't interfere with the top of the aileron servo (see text).*

### SPECIFICATIONS

**Name:** Cherokee .40 (kit no. 176)  
**Manufacturer:** Midwest Products Co. Inc.  
**Designer:** Tom Herr  
**Type:** Sport scale  
**Wingspan:** 61 $\frac{1}{4}$  in.  
**Wing area:** 664 sq. in.  
**Airfoil:** Semisymmetrical  
**Weight:** 6 lb., 5 oz.  
**Wing loading:** 22.1 oz./sq. ft.  
**Length:** 44 $\frac{1}{2}$  in.  
**Radio:** 4-channel  
**Engine range:** .40 to .46 2-stroke; .40 to .53 4-stroke  
**Engine used:** O.S. .46 SF  
**List price:** \$169.95

**Features:** the fuselage is made of die-cut, lock-together Micro-Lite plywood. Tail feathers are made of solid  $\frac{1}{4}$ -inch sheet balsa and can be assembled rapidly. The wing has a semisymmetrical airfoil with nylon bolt attachment, D-tube construction, spruce spars and sheeted leading and trailing edges. Beveled strip ailerons are provided. The hardware includes formed landing gear, nose gear, nose-gear steering arm, nose-gear pushrod, nylon steering block, elevator joiner, nylon control horns, aileron linkage, wing bolts, landing-gear straps and an assortment of screws. The kit also includes a vacuum-formed canopy and cowl; self-stick decals; a 92-page, fully illustrated construction manual; and full-size rolled plans.

### Hits

- High-quality materials and die-cutting
- Fully illustrated, step-by-step instruction manual
- Excellent flight performance

### Misses

- Plans don't include top view or cross sections of fuselage.
- Interference between aileron pushrods and elevator servo

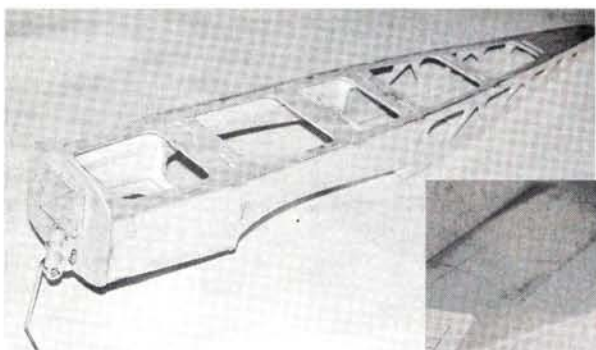




*With the aid of a simple jig, the semisymmetrical wing can be built on a flat surface.*

and back. I found this helpful when I made the cutout for the engine and the muffler, and I didn't join the halves until after the cutout had been completed.

I use 2 3/4-inch wheels for the main gear and a 2 1/2-inch wheel for the nose gear so that the wing is perfectly level when the plane is sitting on the ground. I find that



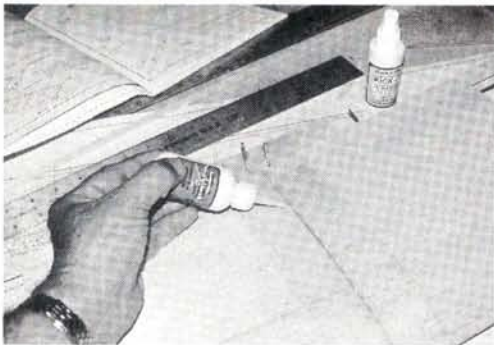
*Here's the fuselage before the addition of the upper sections. This rigid structure is constructed of mostly life-ply.*

this makes takeoffs and landings much smoother when you have a tricycle landing gear.

The fin, the rudder, the stab and the elevator are all made of solid 1/4-inch sheet balsa; this made assembly fast and simple.

## FINISHING

I used Coverite's\* 21st Century fabric for the covering and was very pleased with the



*The wing halves are joined with fiberglass tape and CA. The builder is given the option of using 4 or 5 inches of dihedral. If this is your first low-wing model, go with 5 inches.*

results. I've covered two models with this product, and I've nothing but good things to say about it. For this model, I used light red and white, and I added a 1/4-inch black stripe.

## BALANCE

To get the Cherokee to balance where the plans indicate it should, I had to place the radio battery directly behind the firewall and add approximately 4 ounces of lead to the nose. Even so, the finished product tips the scale at only 6 pounds, 5 ounces, giving it a wing loading of slightly more than 22 ounces per square foot.

## CONCLUSION

The Cherokee .40 is a high-quality, easy-to-build kit that looks great on the ground and in the air. Its light wing loading and inherent stabili-



*The standard-size servos in the fuselage had to be moved up and through the cabin floor because they interfered with top of the aileron servo in the wing. The box on the cabin floor was made of sheet balsa to cover the bottoms of the servos. (See text.)*

ty make it a good second trainer for the novice, and its semisymmetrical airfoil makes it maneuverable enough to satisfy more advanced pilots. I thoroughly enjoyed building and flying this sport-scale version of a classic light plane, and I highly recommend it to both beginners and sport fliers.

*\*Here are the addresses of the companies mentioned in this article:*

**Midwest Products Co.**, 400 S. Indiana St., P.O. Box 564, Hobart, IN 46342.

**Satellite City**, P.O. Box 836, Simi, CA 93062.

**Micro-Lite**; distributed by Frank Tiano Enterprises, 15300 Estancia Ln., W. Palm Beach, FL 33414.

**O.S./Great Planes Model Distributors**, P.O. Box 9021, Champaign, IL 61826.

**APC Props**; distributed by Landing Products, P.O. Box 938, Knights Landing, CA 95645.

**Coverite**, 420 Babylon Rd., Horsham, PA 19044.

## FLIGHT PERFORMANCE

### • Takeoff and landing

Because of the wide span of the main gear, the Cherokee has good ground-handling characteristics. It sits low to the ground, leaving just 1 1/2 inches of clearance for an 11-inch propeller. Tracking on takeoff is good without any application of rudder or elevator. Since the wing rests at zero angle of attack during the takeoff run, the plane stays on the ground, accelerating as power is applied, but it doesn't lift off until you add up-elevator. It then rotates and becomes airborne. The Cherokee has a very shallow glide ratio, and this, with its light wing loading, makes for beautiful scale-like landings. If you grease it in for a three-point landing, it "sticks" to the ground and doesn't bounce back into the air.

### • Low-speed performance

One of the things I like most about the Cherokee is its ability to fly at scale-like speeds without losing stability. It has a very low stall speed, and its stalls are quite gentle. On one flight, the engine quit while the plane was heading downwind at low speed directly over the runway. I had no trouble executing a 180-degree turn and returning to the runway to make a controlled dead-stick landing.

### • High-speed performance

With the O.S. .46 at full throttle, the Cherokee is fast. Control response is crisp, and I didn't notice any bad tendencies at high speeds. Although somewhat out of character, at high speeds, the Cherokee can make some pretty tight pylon turns. The constant-chord wing virtually eliminates the possibility of a high-speed tip-stall. Although I use a hot .46, I'm sure any sport .40 would provide ample power for the Cherokee.

### • Aerobatics

The Cherokee is quite aerobatic and can perform just about any maneuver the average sport flier is likely to try. It flies as well inverted as right side up with very little down-elevator. With the O.S. .46 for power, it can execute huge loops and very tight ones. The plane has absolutely no tendency to roll out of loops. It will do one loop after another without falling out of the vertical plane. Axial rolls require the coordinated application of aileron, elevator and rudder.

The Cherokee performs pretty snappy snap rolls, good sustained knife-edge flight and good-looking tail spins. Spin entry requires full deflection of all three control surfaces, but recovery is immediate when controls are neutralized.



# HOBBICO A S A P ULTIMATE



## S P E C I F I C A T I O N S

**Type:** semi-scale sport biplane (almost ready to fly)  
**Wingspan:** 44 in.  
**Length:** 42 in.  
**Weight:** 7 lb.  
**Wing area:** 660 sq. in.  
**Wing loading:** 24.5 oz./sq. ft.  
**Airfoil type:** symmetrical (top and bottom wings)  
**Wing construction:** balsa, plywood and hardwood with foam sheeting  
**Fuselage construction:** plywood and hardwood with foam sheeting  
**No. of channels req'd:** 4 (elevator, rudder, ailerons and throttle)  
**Engine req'd:** .45 to .50 2-stroke, or .60 to .91 4-stroke  
**Engine used:** O.S. FP .60  
**Prop used:** APC\* 12x8  
**List price:** \$299.95

**Features:** this model is almost ready to fly, and it comes covered with colorful, strong, modular, factory-installed foam sheeting. The kit includes everything to

build the model except fuel tubing, a radio, an engine and glue. The cabane struts are made of factory-bent aluminum sheet, and the engine mount uses adapter plates to fit a variety of engine sizes. The model has four ailerons, a pull/pull rudder-control system and individual elevator half adjustment.

### Hits

- Handsome, scale-like appearance
- Well-designed and well-made construction
- Plentiful hardware supply
- Excellent construction manual with photo illustrations
- Quick assembly time—11 hours

### Misses

- The forward cabane hole wasn't in the correct location, so it interfered with the forward former
- The plane had a tendency to tip-stall at slow speeds



by CHRIS DEFUSCO

# fly it fast! BIPE

## THE KIT

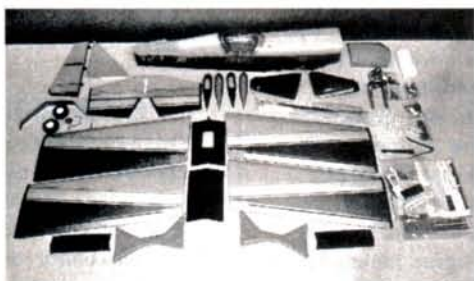
All of the components of the kit are bagged separately, and nothing was damaged. The parts supply is generous; nuts and bolts, control horns, a fuel tank, wheel pants, landing gear, wheels, pushrods, a spinner and an engine mount are included. The quality of construction is quite good. All the joints I could see are well-fitted, and enough glue has been applied to make them sturdy. The wood that's visible appears to be of a high grade and for the chosen purpose. The formers and fuselage side doublers are plywood, and hardwood has been installed at key places where extra strength is needed. The wing ribs are made of balsa, and the wing joiners are a combination of balsa and spruce. Plywood plates are positioned at strategic places in the wing to support the interplane struts.

The foam-and-plastic covering has been factory installed on all of the exposed surfaces except the complex compound curves; vacuum-formed plastic is used in these areas. They include the wingtips, the wing center-joint fairings, the engine cowl, the wheel pants, the horizontal-stab tips, the main gear-mount fairing, the fuselage-to-vertical-stab fairing, the aft edge of the vertical fin, the top and bottom of the rudder, the cockpit and the canopy, and the interplane struts.

The landing gear and the cabane struts are factory-bent aluminum-sheet stock. I hate to install hinges, but I only had to glue the three hinges of the rudder into place. All four ailerons and both elevator halves were already hinged. The factory-installed ailerons were strong. They did bind slightly, because there was a little glue on the hinges, and because the wings touched the ends of the ailerons slightly. They worked freely after a few cycles of the control surface and after I had sanded between the aileron ends and the wings.

## CONSTRUCTION

The 23-page manual is filled with excellent photographs, and the instructions are clearly written. Full-size plans aren't included. This review doesn't have a detailed, step-by-step description of the assembly because the construction steps are so clear. There are, however,



*Everything is included in the kit except a radio, an engine, fuel tubing and glue. All of the components are factory-covered in colorful foam sheeting.*

## FLIGHT PERFORMANCE

*I tested the Ultimate on a slightly windy day at our local, grass flying field. The model is powered by an O.S. FP .60 engine that burns 15-percent-nitro fuel and turns an APC 12x8 propeller. All of the controls were set according to the manufacturer's recommendations.*

### • Takeoff and landing

I had difficulty taking off from the grass runway (the plane kept nosing over and it couldn't get enough air speed), so I changed to larger diameter wheels and removed the wheel pants. (The model wouldn't have had any problems on a paved runway.) After I installed the larger wheels, the model was stable and tame while it taxied—even for a tail-dragger—and it lifted off easily with very little right-rudder correction. With the .60-size engine, climb-out is brisk, and control is very responsive.

While landing, the air speed needs to be kept high, and the nose should be kept level or slightly down. If the model is slowed too much, or if the nose is raised with too much elevator, the model has a tendency to snap. It's best to set up a long, flat, final approach and allow the plane to gradually slow down while you control its descent with the throttle. With this configuration, the model remains stable with good control, but it's still a challenge for the low-time flier.



### • Low-Speed Performance

The model doesn't fly well at slow speeds. Its control response diminishes quickly and the model loses altitude. If the wings are stalled, the break is quick. If the model stalls when the wings aren't level, a tip-stall spin will result. The control throws shouldn't exceed the recommended settings.

### • High-speed performance

This is where the model comes to life. Control response is solid and predictable, and the plane has no tendencies to snap out of the maneuvers. There's plenty of elevator authority, and the four ailerons produce a very comfortable roll rate, even though they're driven by only one servo. I needed to make a slight trim change as the model went to full throttle, but it wasn't anything to be concerned about.

### • Aerobatics

The model is quite aerobatic, and it performed every maneuver I tried. The plane only requires a small amount of down-elevator to maintain level inverted flight, and it flies just as well inverted as it does right-side-up. Sustained knife-edge flight requires a nose-high entry, because the model does slide out of straight and level and gradually loses altitude. If the wings are level and straight into the wind, the plane makes tight loops, and it tracks through them easily. The snap-rolls are incredibly fast (for me). Full aileron, elevator and throttle produce a very pleasing snap roll with a rate of about two rolls per second. The model is a pleasure to fly as long as a high air speed is maintained.

some areas of concern that should be discussed.

Before you start building, look for the update sheets. (There were two in the review kit.) One relates to changes in parts and/or techniques in: cowl mounting, canopy mounting, engine mounting, tail-wheel mounting, tank installation, top and bottom wing joining, rudder control horns, top wing aileron horns, interplane struts and rods and an almost 1-inch backward shift in the CG. Whew!

The other sheet discusses some hardware changes and altering the order of the tank and cabane installation; more on this later. A caution regarding adhesives is in order. The foam that this model is sheeted with will be melted by CA glues. Although the inner and outer surfaces of the foam have a skin that seems impervious to CA,

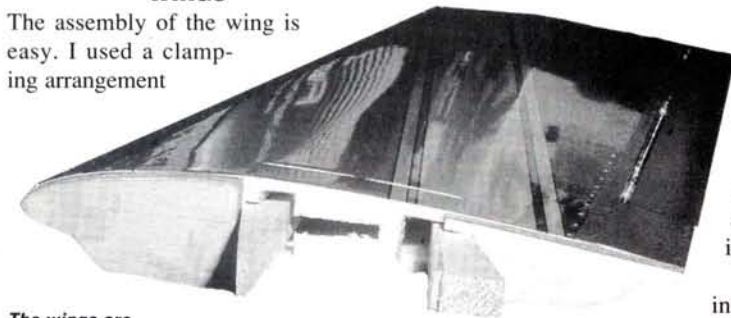


## ASAP ULTIMATE BIPE

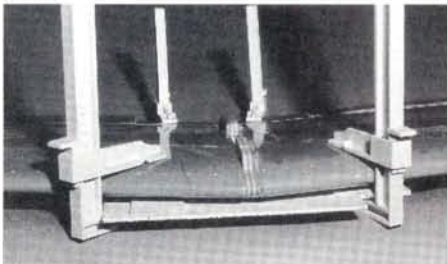
the foamy inside is *not*. CA and its activator will also affect the finish on the vacuum-formed plastic pieces. I did use medium CA (carefully) and 5- to 30-minute epoxies.

### WINGS

The assembly of the wing is easy. I used a clamping arrangement

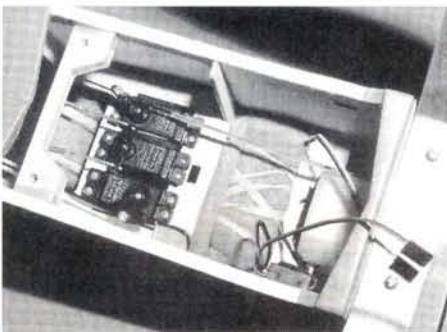


*The wings are joined with a combination of hardwood, plywood and balsa parts (joiners). The mounting blocks are plywood.*



*I used plastic clamps and scraps of wood to maintain the wing alignment while the epoxy cured.*

to ensure that the wing halves were aligned. The wing halves are joined using epoxy and two plywood, dihedral braces for increased strength. They slide into factory-built slots in the roots of the wing halves. The wing center-reinforcement covers fit well and cover the joints. Then I installed the four aileron interconnection horns (two per wing) and the aileron servo rails in the lower wing.



*There is plenty of room in the fuselage to easily install the radio gear. The fuselage is strong and light.*

### FUSELAGE

The instructions tell you to drill two 5/32-inch holes at the dimples on the flat area just behind the firewall to mount the landing gear. I looked, but I couldn't find any dim-

ples. I laid out the hole pattern to mimic the instructional photo—no big deal.

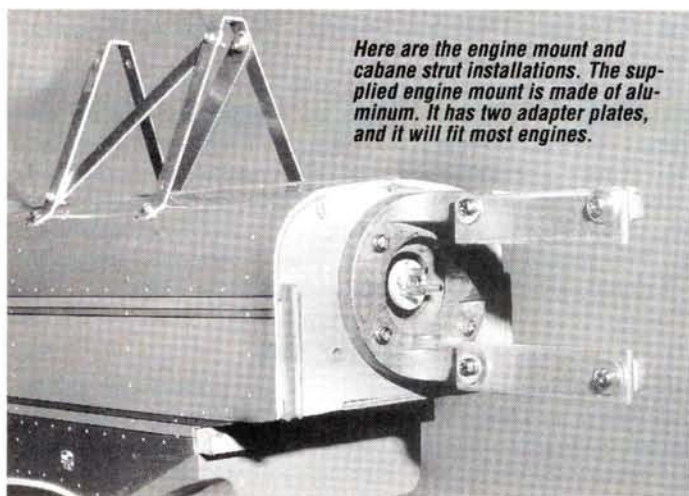
I assembled the fuel tank with a third, separate line for filling the tank. A Robart\* Super Fueler simplified the task. I installed the tank next, but I almost

drilled through it when I drilled the cabane mounting holes. I used silicone rubber to hold the rear of the tank; it's reasonably strong and it damps vibration.

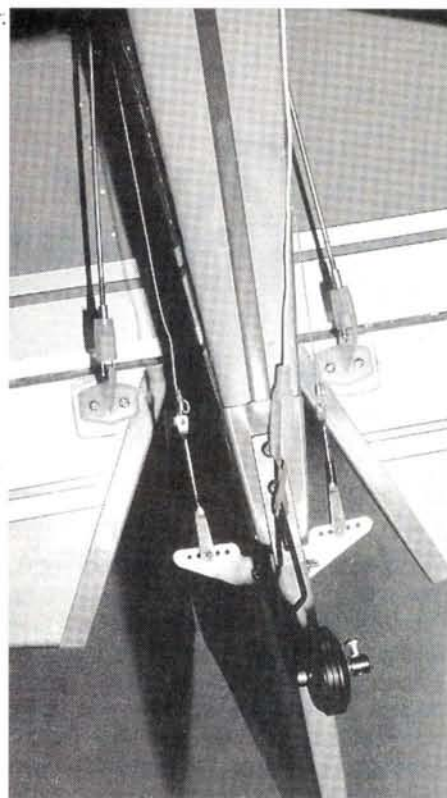
The wing-mounting-block installation was easy. Although the assembly of the cabanes is also simple, I had a problem attaching them to the fuselage. When I drilled the holes through the fuselage, the forward holes lined up perfectly with the center of a fuselage former; I wasn't able to install the blind nuts that secure the forward cabanes. The hardwood blocks beneath the top sheeting of the fuselage looked strong enough, so I filled the forward holes with epoxy, drilled smaller holes and mounted the forward cabanes on the blocks with wood screws. It's entirely possible that the foam/plastic fuselage outer covering with its pre-punched cabane-positioning holes is shifted forward. This would also explain the update notice that states that the printed CG symbol on the fuselage is in the wrong place. The installation of the canopy/cockpit, the wheels and the wheel pants went quickly. The installation of the engine mount is a piece of cake, because the holes and the blind nuts in the firewall are factory installed. The horizontal and vertical surfaces of the tail fit together well, and I didn't need to sand them to fit. Use epoxy so that you have time to make sure everything is straight and true before the glue sets.

### ENGINE INSTALLATION

I chose an O.S.\* FP .60 engine to power the model. It fits nicely in the cowl with plenty of room to spare. It balanced the model perfectly, so I didn't need to add any nose weight. The Robart\* Fueler is at the bottom of the cowl, where it is out of sight but still easy to operate.



*Here are the engine mount and cabane strut installations. The supplied engine mount is made of aluminum. It has two adapter plates, and it will fit most engines.*



*The model uses a pull/pull rudder-control system and an elevator pushrod setup that allow the individual adjustment of each elevator half.*

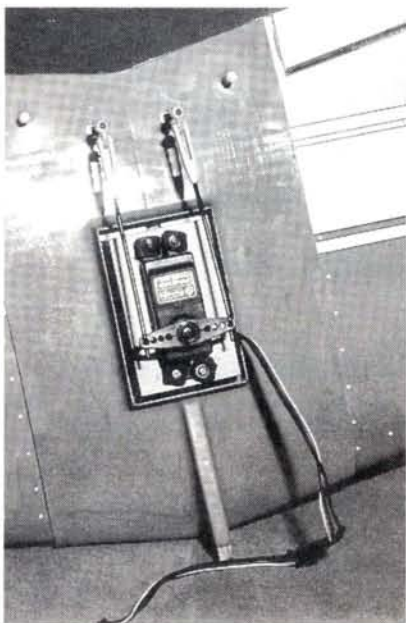
### RADIO INSTALLATION

I installed a Futaba\* Conquest FM radio with four standard S-148 servos and a standard 500 mAh battery. The receiver and servos fit well where the instruction manual describes. I installed the control rods and cables according to instructions without any problems. I was concerned at first because only one servo is used to drive all four ailerons. I'd prefer two separate servos, but as it turns out, one servo has enough power, and the control response is good.



## PREFLIGHT ASSEMBLY

A final assembly was performed to test-fit the sub-assemblies, balance and weigh the model. I assembled all of the components well within 10 minutes. The lower wing is attached to the fuselage with two nylon bolts, and the top wing relies on two no. 8 machine screws threaded into plywood supports that are built into the wing. The interplane struts are then installed between the wings with wood screws. The rigging is solid, and it forms a strong model.



The bottom wing houses the aileron control servo. The bottom wing ailerons are driven with torque rods, and they're connected to the top wing ailerons through interconnecting slave pushrods.

The CG was right on, and the dry model weighed 7 pounds even. This model isn't suited to beginners, because it flies exactly where it's pointed and has little in the way of self-recovery characteristics. It is, however, an excellent choice for those who have mastered routine flight and want to progress into aerobatics. It's structurally sound, it has a handsome appearance, and it flies true. That it can be assembled in a few hours makes it that much more appealing.

\*Here are the addresses of the companies mentioned in this article:

Hobbico/Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61824.

Robert Mfg., P.O. Box 1247, 625 N. 12th St., St. Charles, IL 60174.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

APC Props, distributed by Landing Products, P.O. Box 938, Knight's Landing, CA 95645. ■

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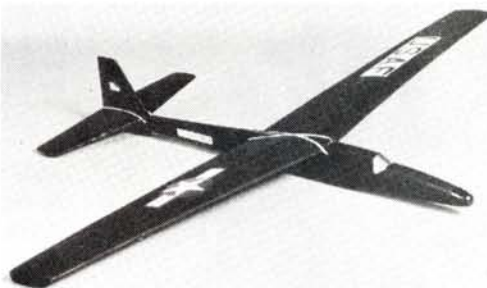
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Plans—\$38

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Plans—\$42

### (101-in. Reno Racer)

Wingspan—101 ins.  
Engine—4.2ci. (minimum)  
Plans—\$52

### STINSON L-5

(1/4 scale)  
Wingspan—102 ins.  
Engine—Zenoah G-38  
(or equivalent)  
Plans—\$38

### (1/3 scale)

Wingspan—136 ins.  
Engine—Zenoah G-62  
(or equivalent)  
Plans—\$48



Accessories available:

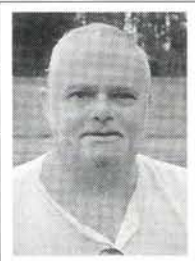
- Scale wheels in 4.5, 5.0, 5.5, 6.0 sizes—available as complete wheels, or buy the hubs separately.
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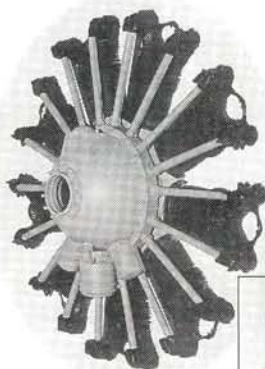
# SPORTY SCALE TECHNIQUES



F R A N K T I A N O

## NEW PRODUCTS AND PAINTING TIPS

IT SEEMS THAT it's just about time, once again, to discuss some of the scale stuff that's recently come into the marketplace. By the way, I realize, as I'm sure you do also, that some of these products have been listed somewhere as "New Releases," but I've always thought that a hands-on view is far better than what the manufacturer says about his own product. In any event, I'm all for any new product that makes scale modeling more enjoyable, easier or less time-consuming—as long as it really works!



*Scale Specialties also offers a very realistic radial engine kit. The first release is for .60-size models (approximately 1/8 size); larger scales will be available soon.*



### PILOTS AND ENGINES

There's a new fellow on the scene with an offshoot company that I, for one, wish well. Headed up by Dave Schwirian, Scale Specialties\* is one of those companies that is producing many of those "things" that you just can't seem to find and have always wished that someone would make.

David's real business is mold-making. Pure and simple? Yes. Requiring skill and technique? Yes. Able to make a fortune in the scale hobby business? No! A labor of love? You betcha! Scale Specialties offers many molded plastic

and resin parts as well as accessories for scale modelers, most in various scales. For example, their new molded dummy engine is a thing of beauty. And though they are in direct competition with my very own molded resin scale dummy engine, I must give them credit. Their engine is molded of a special resin and comes in several major pieces that can be glued together easily. They are far more realistic-looking than any of the vacuum-formed plastic units on the market and weigh just a little more. I truly don't know yet how well they will stand up to vibration, but they are substantial pieces, not flimsy pieces of junk with little or no real detail. These engines are offered in 1/8 to 1/5 sizes and come with a choice of crankcase depths. They start at \$50 and go up from there.

Look for scale prop blades and spinners in the near future, too, from this company. And you may want to give their new pilots a try. The military pilots are made in 1/6 and 1/5 sizes, are molded from a light plastic and have lots of detail. They are complete military pilot figures with flight suits and flying gear—not a hard-to-assemble, vacuum-formed kit! Prices start at \$75 and go as high as

\$130 for a completely painted version. Just send Scale Specialties an SASE for complete information and prices.

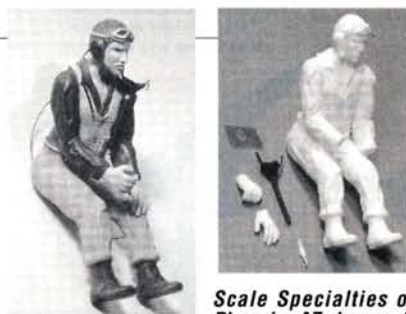
### PLUG-IN WING TUBES

Here's a quickie. For all those times you need a set of plug-in wing tubes and sockets or wing- or stab-adjuster kits, you now have to look no farther than out my back door. Of course, that may be a distance for some of you, but the good old U.S. mail can shorten the journey! Ron Chidgey, famous pattern pilot of yesterday or the day before, moonlights at Gator R/C Products\* and offers tube and socket sets featuring aluminum tube and phenolic sockets for a perfect fit. Five sizes are offered, starting at \$7 for a 2-foot piece of 7/16-inch-diameter stuff and going up to \$15 for 3 feet of 1 1/2-inch material. Scratch-builders will enjoy the added flexibility that a plug-in, adjustable stab or wing kit can give your model, especially when you transport it. These units allow infinite adjustments to increase or decrease incidence after the model has been built. Once again, an SASE will get you a catalogue sheet. Tell them Frankie sent you.



*Vailly Aviation's L-19 Bird Dog has a lot of charisma for a simple high-wing airplane. It's the perfect size at 1/4-scale; the plans show all the scale details for this all-balsa model, including the large flaps.*





**Scale Specialties of Phoenix, AZ, has realistic pilots for 1/6 and 1/8 military airplanes. You can paint them yourself (the molded plastic accepts most hobby paints), or the company can paint them for you!!**

### L-19 BIRD DOG

If I absolutely had to fly a civilian airplane, like a two-seater with a cruise speed about half that of my new Northstar-powered Caddy, I guess it would have to be painted in a military scheme and at least have the capability of carrying some smoke bombs or grenades, or marker flares—you know, some sort of ordnance. Even propaganda-printed lollipops would be acceptable.

Anyhow, Roy Vaillancourt of Vailly Aviation\* finally is offering kits and plans of one of the high-wing "targets" that just might be an acceptable alternative for the heavy-metal guys. We saw an L-19 Bird Dog several years ago on the pages of *Model Airplane News*. You may remember I did a "Field and Bench Review" of the one brought into the country by Circus Hobbies. Well, Roy's L-19 is a little larger and a bit more impressive. Those who want a terrific first-time scale subject and prefer the slower types of aircraft should really go gaga over this one. This Cessna weighs only 22 pounds and can fly on anything from a Super Tigre 2500 up to a G-38 or Q-42; anything else would be overkill. Its 108-inch span packs 1,450 square inches of area that offers a wing loading similar to that of a kite. You can purchase plans, cowl, gear, photo pack, or a complete kit or partial kit directly from Vailly; best of all, you can get it *now*!

Another civvy type you can get right now is the spanking brand-new Extra 300/S manufactured by Carden Aircraft\*, which is just down the street from me. With the full-scale airplane just minutes away, it was fairly easy for Carden to duplicate and offer exact scale outlines in a 30-percent-scale kit. By the way, 30 percent means you get a wingspan of 89 inches with 1,460 squares and an 18- to 22-pound weight for 3.0 to 4.2 cubers (and sparkling performance). I had a chance to look at one of the first kits; to tell you the truth, I was quite impressed. The wood is of the finest quality; the sockets are pre-cut in the foam pieces so you don't have to play around with a soldering gun and pieces of brass tube; and the gear is a heavy-duty unit made out of T-6 aluminum, which is formed to the scale shape. Grab an envelope, put a stamp on it, address the back with your return address and fire it off to Dennis at Carden for a spec sheet. You civvy guys who know how to fly are gonna love this one!

### PAINTING MAILBAG

I received many letters during the past several weeks dealing with the same sub-

## THE R/C CHANNEL ANALYZER

**H**ere is something that I believe every AMA or SFA club in the country should have in their inventory, especially if they host any fun-fly or competition events.

The R/C Channel Analyzer is a unique instrument that combines state-of-the-art receiver technology with a bit-mapped, graphics liquid-crystal display (LCD) in a pocket-size spectrum analyzer. Its performance rivals that of laboratory spectrum analyzers, which cost 10 times or more its \$795 price. Dr. Jim Hauser, of the Aero Spectra\* corporation, has accomplished this by including only those features which R/C modelers need for frequency management, evaluation of transmitter performance and radio-frequency interface control.

Briefly, the R/C Channel Analyzer is a fully synthesized, microprocessor-controlled, narrow-band receiver that steps through a selected range of frequencies and displays a histogram of received amplitude versus frequency on the bit-mapped graphics LCD. Because it is microprocessor-controlled and fully synthesized to a quartz crystal reference, virtually all of its operations are automatic. It is easier to use than any other spectrum analyzer available today. In fact, as the photographs show, there are only four buttons on the front panel, and one of these is the on/off button. The other three buttons control the channel selection and the mode. It is easier to operate than a TV remote control. To adjust for varying lighting conditions, an LCD contrast control is provided on the side.

The R/C Channel Analyzer will display all designated R/C channels in the 50-, 53-, 72- and 75MHz bands. (Earlier 72MHz-

only versions can be upgraded for \$125.) To select a channel for viewing, press the channel/cursor keys until the channel you want is displayed. The bands automatically change when the next channel is in the next band.

Depressing the mode key selects one of the four display modes. The wide-band mode displays the 1MHz segment that contains the selected channel. The zoom mode displays the 60kHz of spectrum adjacent to the selected channel. The quasi-peak mode is similar to the zoom mode, but it displays the envelope of the signal modulation; this is useful for transmitter evaluation. The signal-strength mode displays the frequency selected, the corresponding channel number and the approximate signal strength of any signal at that frequency in dBs above the base line.

The instrument uses a common 9V alkaline battery. Because of an auto-off feature, which turns the unit off after 15 minutes (when it's not being used), battery life is very long. Even with constant use, you can expect a weekend of contest activity from a single battery.



**This R/C Channel Analyzer is ideal for clubs that put on shows or fun flies, because it makes frequency control much easier.**





**Carden Aircraft's Extra 300S looks small sitting next to the full scale, but it's really 1/3 size! The revolutionary clam shell fuselage sides, which are added to the basic box structure, ensure easy, yet accurate, fuselage outlines.**

ject matter, so I figured it may be of interest to some of you newcomers. The questions were: "How do I know which hobby finishes are compatible with which?" "I often get weird reactions, such as bubbles and blisters, when I use certain paints." "Why won't my epoxy or resin cure all the time?"

The answers to these questions could fill a small booklet, so I'll try to condense the more important rules. Polyester resins will cure over most 5-minute epoxies but will *not* cure over most 30-minute varieties or finishing resins. Pacer Technology's\* Z-poxy is one I know of that was formulated to allow polyesters to cure over it, and it was the result of a laboratory experiment that took years to perfect! Many resins won't cure over some brands of CA. K&B\* and Sig\* produce the most popular polyester resins and they will cure over Zap\*, Goldberg Jet\* and Sig CA. Some off-brands don't allow a full cure. Always try a sample before you try it on your model.

Epoxy paints will go over just about any other type of paint except certain polyurethanes; polyurethanes will go over almost any type of paint, too. But, don't attempt to place a coat of anything else over these two materials. Lacquers sprayed over epoxies or polys will probably curdle. Spray enamels, sometimes called "one-part epoxies" by mistake, will shrivel and shrink when used with anything but their own products (the same goes for most automobile or household spray paints). Almost anything will go over lacquers. Only similar brand enamels and epoxies will go over each

other, and polyurethanes are in a class of their own.

Most primers will accept any type of paint. I say most, because Coverite's\* 21st Century primer seems to work well only with certain similar types of enamels. As I said before, always make a test sample if you're not sure. And if you do make a mistake, try like heck to remove the offending material ASAP. Cured paint can sometimes be a bear to remove. I hope this information is helpful.

## IN MEMORIAM

Several weeks ago, one of scale modeling's friendliest, funniest and most sincere people left us. Roger Young passed away after a brief, but brutal, bout with cancer. Those of us who knew him grieve the loss of this bright young man; the Masters, Rally of Eagles and Top Gun will not be the same without him.

*\*Here are the addresses of the companies mentioned in this article:*

**Scale Specialties**, P.O. Box 50791, Phoenix, AZ 85076.

**Gator R/C Products**, 3713 Pompano Dr., Pensacola, FL 32514.

**Vailly Aviation**, 18 Oakdale Ave., Farmingdale, NY 11738-2828.

**Carden Aircraft**, 1731 NW Madrid Way, Boca Raton, FL 33432.

**Pacer Technology and Research**, 9420 Santa Anita Ave., Rancho Cucamonga, CA 91730.

**K&B Mfg. Inc.**, 2100 College Drive, Lake Havasu City, AZ 86403.

**Sig Mfg. Co.**, 401 S. Front St., Montezuma, IA 50171.

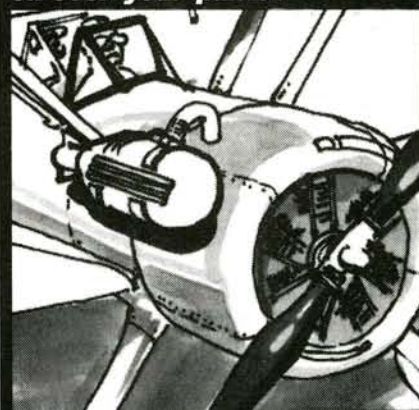
**Zap-a-Gap**: distributed by Frank Tiano Enterprises, 15300 Estancia Ln., W. Palm Beach, FL 33414; **Robart Mfg.**, P.O. Box 1247, St. Charles, IL 60174; **House of Balsa Inc.**, 10101 Yucca Rd., Adelanto, CA 92301.

**Carl Goldberg Models**, 4734 W. Chicago Ave., Chicago, IL 60651.

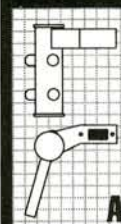
**Coverite**, 420 Babylon Rd., Horsham, PA 19044.

**Aero Spectra**, P.O. Box 3021, Boulder, CO 80307. ■

**Do you put your underwear on over your pants?**

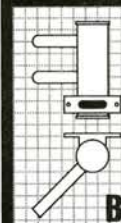


**Then why leave your muffler outside the cowl!**

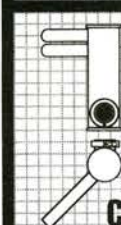


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# AVOIDING CATASTROPHE

by ROY DAY

*"...AIRCRAFT WITH NASTY tendencies displayed them before the crowd, and quite a few fell out of the sky. Duke Crow's G59 Fiat, one of three to be introduced to unlimited racing this year, tip-stalled at slow speed during qualifying and self-destructed. Kent McKenna's Fiat and Scott Manning's Fiat suffered a similar fate. 'I guess we should build in a little washout, next time,' said Dave Abbe, sponsor of the three entries..."*

—Rob Wood

*"The 1992 Madera Unlimited Races"  
Model Airplane News, Feb. '93*



PHOTOS BY ROY DAY & ROB WOOD

A scene from the '93 Reno Unlimited races. Photo by Rob Wood.

# Taming that Stall

This article describes the behavior of stalled aircraft and ways to make the inevitable stall less likely to result in a crash. Consider these crash scenarios:

• **Crash no. 1.** The airplane accelerates rather slowly down the grass runway and is pitched up abruptly in an attempt to take off. About six feet in the air, it rolls quickly to the left, hits on the left wingtip and cartwheels off the runway. Damage can be slight or can result in a broken wing and/or a twisted fuselage.

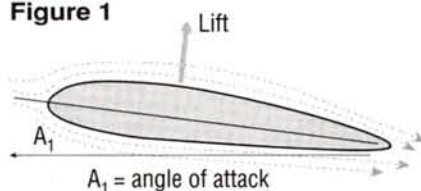
• **Crash no. 2.** The pilot begins to turn onto final approach for landing about 200 yards from his position. The airplane is flying slowly and, suddenly, it rolls left to a vertical bank and dives. The pilot explains that he gave corrective commands but got no response.

In each scenario, the airplane experienced "tip-stall," or did a "snap." Although tip-stalls occur during takeoffs and landings, the problem is generally more troublesome during landings. Most, if not all, R/C pilots will agree that landing is the most difficult part of normal flying, not counting complicated aerobatics. In landing, the pilot must simultaneously judge approach speed, descent rate and the track of the model onto the runway. Many full-scale airplane pilots agree that landing an R/C model airplane is more difficult than landing a full-scale aircraft. In R/C, you have

no airspeed indication, no stall warning, no rate of descent information—only distant visual indication of the model as it approaches the runway. Therefore, it is important that the model has good low-speed behavior and stall characteristics.

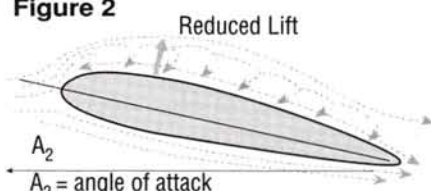
If these scenarios sound familiar, then you've experienced tip-stall. It is the cause of many crashes. Let's examine what's happening and some ways to modify your model aircraft to minimize these undesirable characteristics.

Figure 1



**Normal flight, un-stalled wing.**  
• smooth flow over wing  
• lift equals weight for level flight  
• small angle of attack ( $A_1$ )

Figure 2

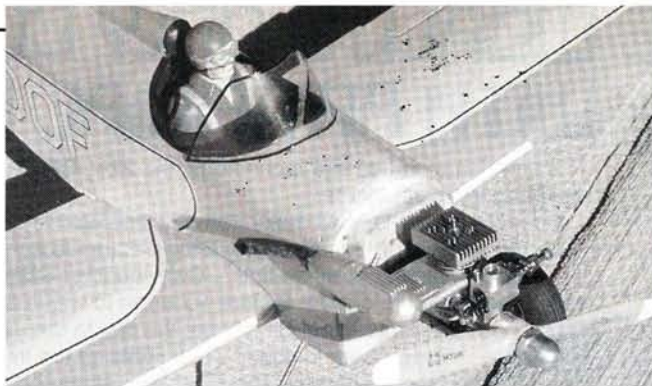


**Stalled wing**  
• turbulent airflow over wing  
• reduced lift  
• high angle of attack ( $A_2$ )



## WHAT IS A STALL?

First, let's understand what we mean by a stall and how it affects an airplane's flight. Figure 1 illustrates the airflow around an airfoil (wing) under normal flying conditions. The angle of attack ( $A$ ) is probably less than 5 degrees positive. This angle is measured from the direction of flight to some reference on the airfoil, typically the chord line. When the airplane slows down, the angle of attack must be increased to develop enough lift to maintain level flight. (Lift is a function of the square of air speed.) The pilot makes this correction by commanding more up-elevator. All is well until the angle of attack reaches a point at which the airflow over the wing is no longer smooth, but turbulent. This may occur at an angle of attack of 12 to 15 degrees, depending on the airfoil. This is



**Figure 10** After flight tests had shown that his Flybaby had a tendency to tip-stall, the author installed a length of tri-stock on the inboard wing. This served as a stall strip and prevented further tip-stalls.

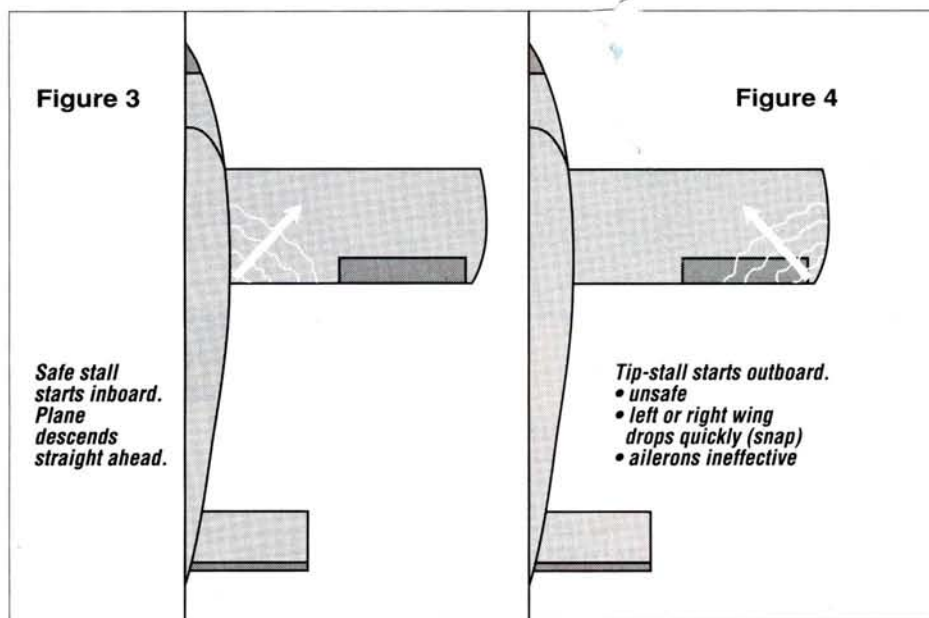
rapid wing drop on one side or the other occurs, and the airplane "snaps." The ailerons are in a stalled region and ineffective, so no control is possible. Whether the stall begins on the inboard (safe) or outboard (unsafe) part of the wing depends on many factors, including

twisted as shown in Figure 1, the inboard part of the wing is at a higher angle of attack and stalls before the tip portion. This results in a straight-ahead stall with full aileron control. (The outboard part of the wing remains unstalled.)

Washout can be built in during wing construction by shimming up the trailing edge near the tip. If you are building a foam wing, just skew the root and tip templates by the angle of washout. Then, when you cut the wing, the washout is already built in. For a built-up wing, you can get the desired washout after the wing has been covered by applying heat alternately to the covering on the top and bottom while you twist the wing. If the wing is so stiff in torsion that it cannot be twisted, then one of the following methods should be used.

- **NASA Leading Edge Drooped Cuff.** In this design, the outer 40 percent of the wing has a different airfoil with more nose down camber and a larger radius of the leading edge. Figure 6 shows the configuration. The Drooped Cuff is used on a number of operational aircraft. It improves the stall in two ways. First, the nose down camber is similar to washout and delays the stall on the outboard part of the wing. Second, the Cuff's larger leading-edge radius also allows the outboard portion to stall at a higher angle of attack than the unmodified inboard wing.

The NASA Drooped Cuff is a favorite



the situation shown in Figure 2. The wing is now stalled and produces very little lift, not enough to support the weight of the airplane. We say the airplane "quits flying."

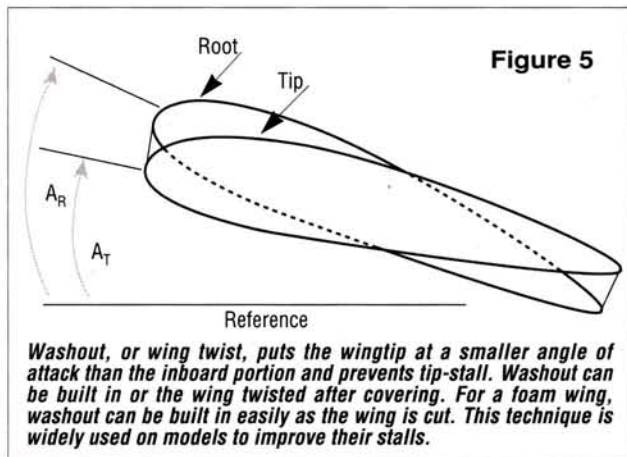
We have been looking at the cross section of a typical wing. Unfortunately, the entire wing does not stall at the same time. In each of the scenarios, if the airplane had stalled straight ahead, with no tendency to roll left or right, and simply lost altitude with full aileron control, then it would not have crashed. This would have been a "safe" stall, i.e., the wing begins stalling inboard and then progresses outboard as shown in Figure 3. The loss of inboard lift on both wings—although not necessarily equal—causes the airplane to descend, but it leaves the outboard portion still lifting and the ailerons still capable of controlling any tendency to roll. If, however, the stall begins first at the tip (as illustrated in Figure 4), then

wing planform and the use of design features to tame the stall.

## TECHNIQUES FOR MODIFYING STALL CHARACTERISTICS

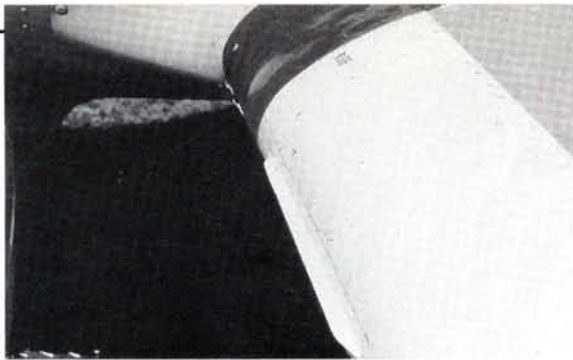
There are several techniques/devices used on full-scale aircraft to improve their stall characteristics. Most are applicable to model airplanes as well. Some must be designed into the model; others can be readily added after the plane has been built and flown.

- **Washout.** This is probably the most widely used method to obtain gentle, straight-ahead stalls on both



**Figure 5** Washout, or wing twist, puts the wingtip at a smaller angle of attack than the inboard portion and prevents tip-stall. Washout can be built in or the wing twisted after covering. For a foam wing, washout can be built in easily as the wing is cut. This technique is widely used on models to improve their stalls.





**Figure 11** Here, a stall strip has been installed on a full-scale Navion. Stall strips are used on many operational aircraft.

method used by noted model designer Andy Lennon. He has described its design and flight characteristics in several articles and has also mentioned it in his book, *R/C Model Airplane Design*.

The Drooped Cuff is usually built into the wing during construction. But a leading-edge cuff could be shaped from balsa, foam or plastic and added to a completed wing in cases where flight tests showed a need for better stall behavior.

• **Stall or wing fences.** Wing fences are small, thin devices mounted perpendicular to the top surface of a wing. They generally line up with the airflow and are typically placed just inboard of the ailerons. They help to prevent stalled airflow from progressing spanwise from the inboard part of the wing to the outboard. Thus, they can delay tip-stall and improve the aileron response at high angles of attack. I have not seen them applied to model airplanes as stall devices.

• **Slots and slats.** Wing slots and slats are effective ways to delay the stall to a higher angle of attack. Figure 7 shows typical designs. The slot is a small airfoil mounted just ahead of the leading edge that channels the airflow over the wing, keeping the flow attached. With

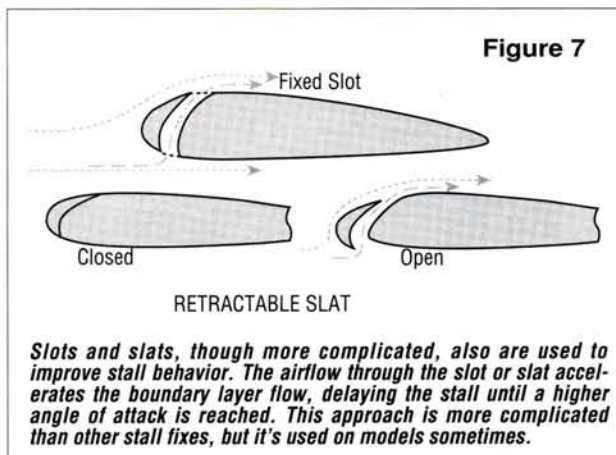
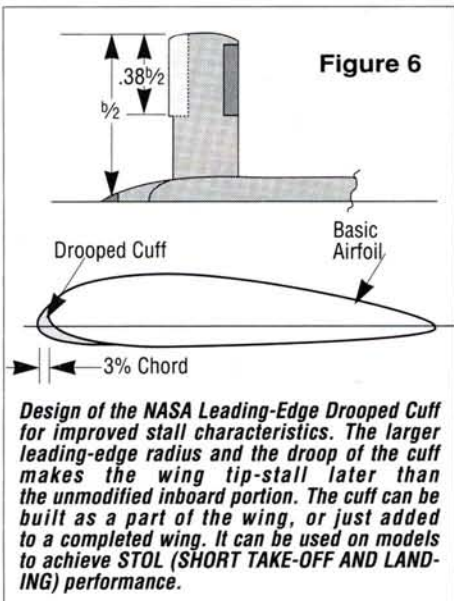
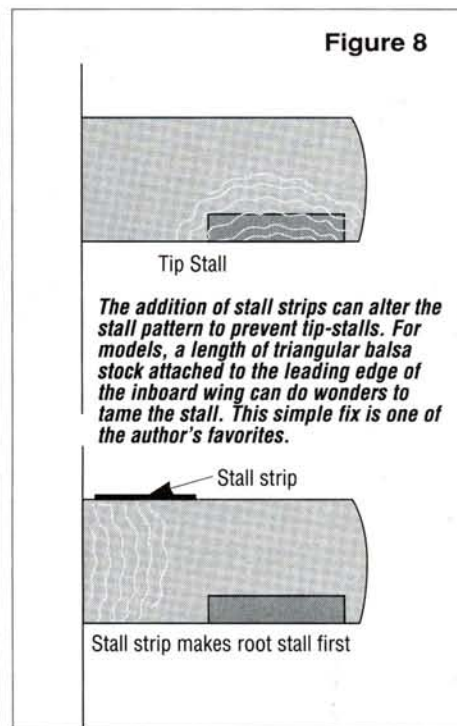
slots on the outboard section of the wing, tip-stall or wing dropping can be prevented.

Slats are movable slots. Part of the leading edge is mounted so that it can be extended and retracted. Slots and slats have been used on models. The slots, however, are more practical for models.

• **Stall strips.** These are lengths of triangular or T-section material attached to the wing's inboard leading edge. They effectively sharpen the leading edge of the airfoil and cause the inboard wing to stall before the outboard. Figure 8 shows how the stall pattern can be altered on a wing by adding stall strips. Figure 9 shows how small the stall strip can be compared with the wing cross section.

Stall strips are simple to install on both full-scale airplanes and models. They are widely used on a number of production light airplanes. Figure 10 shows a stall strip installed on the wing of a full-scale Navion. The strips can be used with any wing planform and, best of all, they can be added after the wing has been completed. In fact, I added them to a Flybaby model after flight tests showed that it had a tendency to tip-stall. The wing was so stiff in torsion that I could not twist it to get washout. I used a section of 1/4-inch triangular stock attached with clear plastic tape to about 40 percent of the inboard span. (The installation on the Flybaby is shown in Figure 11.) The stall strips cured any tendency to tip-stall.

In contrast with washout—which produces the opposite effect during inverted flight—stall strips work equally well in upright or inverted flight. They are so simple to install and, if necessary, modify, that I have used



**Figure 9**



The stall strip sharpens the leading edge, causing the inboard wing to stall earlier than the basic airfoil. Therefore, it can prevent tip-stalls.

them on several of my model airplanes with good results.

## CONCLUDING REMARKS

Good low-speed flight characteristics of R/C models can minimize the chances of crashes during takeoff and landing. No matter how

good a pilot you are, sooner or later you will encounter a situation where a straight-ahead stall (no snap) will save your airplane from a crash. Several methods have been presented to help you achieve desirable stall characteristics. The two simplest means are the use of washout, or stall strips.

If your airplane has a tendency to tip-stall, try one of the "fixes" discussed in this article to "tame that stall." ■







# Giant Scale at Greenville South Carolina

*Curtis Mees tows his Steen Skybolt to the flight line. The area of the pit shown is about only a sixth of the total area.*

**T**WO HUNDRED AND sixty-seven pilots took over 400 giant planes to Greenville, SC, for the Eleventh Annual Joe Nall Giant Scale Fly-In on May 13 to 16, 1993. Imagine a beautiful grass runway 3,500 feet long, with the first 1,500 feet wide enough to accommodate all the pilots' cars, motor homes, trailers, motorcycles, etc.—plus a generous pit area—and a 400-foot-wide runway. And then imagine the runway portion is mowed early every morning before most of the modelers are even awake in their motor homes.



# Joe Nall Men



*Above: Stinger Wallace's 90-inch P-51 on climb-out; gear coming up; Husqvarna G.O. Monster Motors. Below: Frank Noll does his stuff while another outstanding pilot, Don Lowe, critiques.*



*Above: Stick Larsen's gorgeous 1/4-scale Albatross from Effinger plans. Weight—20 pounds; engine—Q42; prop—20x6. Stick flies it "just right."*



*Above: A good flyby by an Ultimate.*

*Below: Mac Hodges' 16-foot, B-29 comes in for a photo pass. Weight—100 pounds; engines—Q42s; beautiful sound; smooth flier.*







## STORY & PHOTOS BY DAN PARSONS

I have just described Hartness Field, which is on Pat Hartness's 500-acre estate, which is just on the edge of Greenville, SC. Combine this R/Cers' heaven with Pat and Kirby McKinney's motto, "We specialize in fun, fellowship and hospitality," and it's no mystery why this meet is so popular and keeps growing year after year.

And Kirby McKinney? He's Pat's neighbor. They've been buddies since they were young kids, and both have been in R/C almost that long.

# Memorial Fly-In



Above: Bobby Benoit's P-40 (from Ziroli plans) thunders by on a low pass; 5.3 Stihl from Monster Motors; 35 pounds.

Below: Caught in the air—a 1/3-scale Sopwith Pup from the Balsa USA kit.

Below: Bobby Benoit's 1/3-scale Pup from the Balsa USA kit. (fun fliers in low-wind conditions).



Above: Stinger Wallace's "Green Machine." Note the vertical stab and rudder in the grass. This after-hours, fun flier, Quickie 500 with 60 on tuned pipe had everyone watching Stinger's antics. Below: Pat Hartness in rear seat of his pristine Stearman just after liftoff. That's Jerry Smith in front, ready with his camera for air pictures.





(Continued from page 67)

## THE MEET OPENS

Starting on Thursday—the official meet, that is—this year's event was extended by a day. Some people arrived as early as Monday. When Bette and I arrived early on Wednesday afternoon, many modelers were already encamped.

The first person I recognized was my old friend Curtis Mees from Atlanta, GA. He told me that Stinger Wallace was encamped farther on down the line, so after chatting with him, I went looking for Stinger. Then I heard this thunderous roar and saw a big P-51 right on the deck, streaking down the runway, and I knew I had found him. Sure enough, there was Stinger, feet spread, putting on his usual great show. With a Husqvarna 6cid engine in his 90-inch P-51, no muffler and the sky all to himself, his flying was awesome both in sight and sound. He, Scott Broughton and Bobby Benoit (with their wives) had been there since Monday after driving in from Lufkin, TX. They had the



Scott Broughton starts the 5.3 Stihl engine on Bobby Benoit's P-40. Bobby holds the plane while Stinger Wallace and Robert's Bob Walker watch.

foot-long pit area showed that 95 percent were scale models with many that would be very competitive in any scale contest.

## TOP FLIERS

There was no lack of topnotch fliers. Ohio produced the likes of Frank Noll, Don Lowe (now in Florida) and Miles Reed; Warren Thomas and O.W. Maness came from North

Quadra 52 swinging a special APC 20x10 provided not only plenty of speed but also excellent vertical performance. This is a fine example of how important it is to have the correct propeller/engine combination for optimum results with a particular plane.

After Frank Noll's first flight with his Ohio R/C Extra 300, Pat Hartness was so impressed that he broke a standing rule of no demo flights during the meet's official flying hours and asked Frank to put on a show. And that he did! In the opinion of many (including me), Frank is as fine a show pilot as anyone in the U.S. today. I once timed him continuously torque-rolling his Ohio R/C Ultimate for 2 minutes, 20 seconds, and he could have done it for the entire flight. I have to put in a plug for such a great pilot and all-around good guy: Frank now produces a kit of a 38-percent-scale Christen Eagle. He can be reached at (513) 296-1290.

***A walk along the 1,500-foot-long pit area showed that 95 percent were scale models with many that would be very competitive in any scale contest.***

better part of three days' flying before the meet even started. Now, that's dedicated R/Cing!

The meet officially started on Thursday, and people streamed in all day, adding to the early arrivals until most of the vehicle spaces were taken. You could hear people exclaiming, "And this is only Thursday!" With five flight lines and still not too many people flying, the wait to fly on Thursday wasn't too long.

Friday, however, was a different story. Additional fliers, combined with an inefficient transmitter- and frequency-control system, really slowed things down to where one was fortunate to squeeze in a flight that day.

But, contrary to the way most people run a meet, on Saturday, these fellows listened to suggestions from many of the fliers and changed things to speed up the flight operations by four to one (a big improvement, and everyone felt better about the situation).

Though this meet is billed as a "Giant Scale Fly-In," non-scale models are allowed if they meet the minimum wingspan spelled out by the IMAA rules: 80 inches for a monoplane and 60 inches for a biplane. But a walk along the 1,500-

Carolina; and then there was that stalwart bunch who came all the way from Houston, TX: Tommy Jacomini, Harold Roberts, Buddy Pritchett, plus two father/son teams, Ron and Jon Beard and Jim and James Osborn. Course, all these fellows (ex-pattern competitors) fly only Lasers and Extras, so I have to downgrade them a bit—ha!

Bobby Poston, from nearby Seneca, SC, flew his Byron P-47 with great authority and a smoothness that was a delight to watch. In R/C only about four years, he told me he concentrates on smoothness "because that's how the full-scale ones fly." As to my question about the weight of his P-47, his answer was, "I have no idea" (shades of Ted White and Kirby McKinney!). Interestingly, a



A 1/4-scale SR9 Stinson Reliant fully detailed and flown by Slick Larsen. Weighs 28 pounds; SD 3.7; 22x8; majestic flier.

## SOUTHERN BIRDS

The state of Georgia seemed to produce its fair share of fine pilots and absolutely gorgeous planes, e.g., Slick Larsen with his completely detailed 1/4-scale SR9 Stinson Reliant and 1/4-scale Albatross. He flew both smoothly and with grace. The word "majestic" just fits his 10-foot Stinson Reliant.

Another majestic model—both on the ground and in the air—is Dick Konkle's big Stinson with all the details (scale navigation maps, working compass, etc.). This plane has won top static awards wherever it has been shown. No hangar queens these!

From the Atlanta area, John Fountain, under the original tutelage of Curtis Mees, skillfully flew both an immaculate Cub and a Corsair. In R/C only a few years, John is another one of those builder/pilots we call "a natural."

And quiet Curtis Mees, who's sort of an R/C guru in the Atlanta area (designer, master builder, fine flier and instructor), brought along his beautiful Steen Skybolt.

The announcing chores were adeptly handled by the smooth-talking four-some of Jim Van Loo, Ed Izzo, Ray



## JOE NALL MEMORIAL FLY-IN

Killingsworth and Geoffrey Styles. (Geoffrey, my wife loved your oh-so-smooth British accent!) Besides giving information on the pilots and their planes, the announcers kept tabs on the fliers and, when necessary, told us to "Move it out some," or "Follow the pattern."

And what was Pat Hartness doing during the meet? When he wasn't walking through the pits talking to everyone or flying other people's planes (Don Lowe's Davis Acro), he was hauling pilots in his golf cart out to their just-landed planes.

To say that Pat is a hands-on R/Cer is a gross understatement. He had hoped to have a big Sea Fury ready to go, but he didn't quite make it. The size of the Sea Fury was determined by the cowl's being large enough to completely conceal an S.D. 11.6 twin. Last year, when the official flying was over, he flew two demo flights with his gorgeous, 14-foot, B-25 powered by S.D. 5.8s—smooth, totally realistic, beautiful music (all understatements!). These were its last flights, because Pat donated it to a museum.

And what about Kirby McKinney—Pat's longtime buddy and R/C compatriot? Kirby spent most of his time taking care of problems that arose and checking with everyone to make sure they were having fun.

Kirby's wife, Carol, worked at the registration table with her daughter, Laura, and Carol Williams, Brenda Barnett, Lynne Byrum, Gale Keller and Janet Gregory. Many thanks for your efficient help; where would we be without you all?

### RARE SIGHTS

But I didn't go to Hartness Field just to watch and take flight pictures, as I did last

low, high-speed pass. Since I was already pulling up and breaking to the left, there was no problem in clearing the trees and coming around for the landing. Being a bit nervous (I don't like losing an engine on a twin!), I blew the landing. On the hard touchdown, the right gear flew out. In over 10 years of flying my Hornet, this had never before happened. Expecting the worst, I was relieved to discover that the gear had come out because I had, after some routine maintenance, replaced only one of the six screws that hold it in the plane. In just a few minutes, it was ready to go again. When I arrived home, I found out that the right engine had been overheating, then going lean, then quitting because of a bad rear crankshaft bearing. New bearings completely solved the problem.

In all the years that I've been going to meets, I've never seen an all-black Spitfire, much less an all-white one. At this meet, there was one of each! The black Spit, from the Yellow Aircraft kit, was built and flown by Scott Broughton (Stinger Wallace's buddy from Lufkin, TX). Powered by a G-62 swinging an 18x8/14, Scott's glossy, black, 21-pound beauty is very fast and has excellent vertical performance that allows him to put on a fine show.

It appears that the 8/14-pitch props on the Quadra 50, the G-62 and the 4.2 engines, produce almost magical results in the faster, high-performance models. Prop sizes: 18 inches for the Q-50; 19 inches for the G-62; 20 inches for the 4.2.

A big, well-finished P-40 built by Bobby Benoit (from Ziroli plans) is the only properly powered P-40 I've ever seen. Weighing 35 pounds and powered by a 5.3 Stihl, this P-40 had "spirited" performance, especially in the hands of Stinger Wallace. And Bobby did fine with it on another flight.

In a complete change of pace, Bobby spent about an hour putting his beautiful Balsa USA Pup together and then leisurely flew it around the field. Without a crosswind, these big Pups make prettier



Pat Hartness flies Don Lowe's Davis Acro from Bob Godfrey's kit; Frank Noll critiques.

landings than any other R/C model.

Since the boys from Lufkin, TX, and Louisiana use such big engines on magneto or glow, they need a big starter—and a big one they had. A fine-looking unit produced and sold by James George, it really turns over those big Stihls and Husqvarnas. If you're interested, you can contact James at (318) 396-7801.

### BIG B-29

After Friday's official flying, it was time for the event everyone was waiting for. Mac Hodges fired up and checked the four Quadra 42s on his 16-foot, 100-pound, B-29, taxied up the runway, turned into the wind and made a takeoff that was as pretty and scale-like as you'll ever see. Mac made several circuits of the field, with two photo passes at about 30 feet then a thundering low pass at about 4 feet! In the hands of this obviously skilled pilot, the B-29's flight was smooth and flawless. His turn to final and absolutely steady approach followed by a slight flare and touchdown on the mains while holding the nose wheel off were done to perfection. Needless to say, the crowd was most appreciative. Mac is from Andersonville, GA, where he has a hobby shop, and he is considered to be one of the best pilots in the South; I believe it. More on Mac later.

At noon on Saturday, the modelers were asked to put their planes along the center of the runway, and the spectators were invited out to view and photograph them up close. Then Pat Hartness put Jerry Smith in the front seat of his immaculate Stearman, and off they flew for aerial pictures. Pat's take-off and landing were a joy to watch—especially his approach to the landing.

(Continued on page 102)



Bob Clabaugh's 1/4-scale Red Baron from Don Godfrey plans. Weight—28 pounds; engine—G62.

year. This year, I had my twin-engine deHavilland Hornet. About three-quarters of the way through my first flight on Thursday morning, the right engine quit just after a

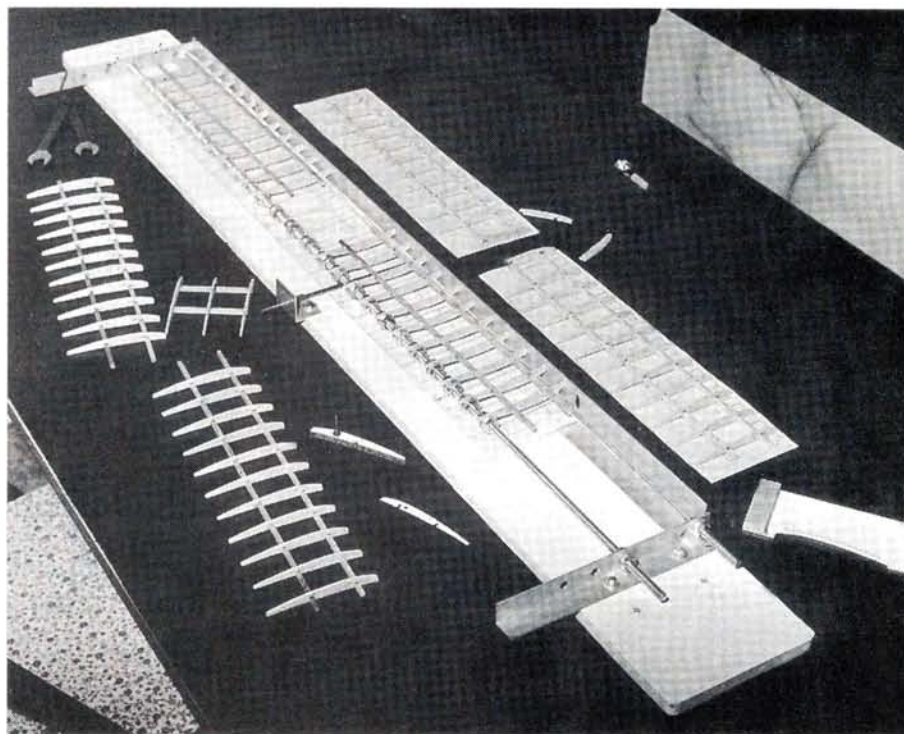


HOW TO

Ensure precise  
alignment the  
easy way

# The Nutty Wing Jig

by JOHN B. GASCOYNE



**T**HE NUTTY WING Jig is easy to make. It provides precise alignment and the means for fast assembly of wing ribs and spars. Once you've used this method, it's unlikely that you'll ever go back to the time-consuming, imprecise alignment process that involves using pins stuck into a flat building board.

When I decided to build a  $1/12$ -scale model of the WW I Sopwith triplane for static display, I devised a method for the speedy, uniform production of the 81 ribs (plus spares) and the 138 riblets that would make up the wings. Then I looked at that treasure pile of 90 ribs and 140 riblets—all under-cambered—and realized that I would also have to construct a jig so that I could precisely align and rapidly assemble these ribs and their bottom spars.

Experience has demonstrated that assembly of under-cambered ribs upside-down, i.e., bottom up, on a flat building board, causes the same frustration as that which comes with assembly of the more modern roly-poly, teardrop airfoil. Besides, assembling the ribs on a flat building board would mean working over and around several hundred pins. No thank you! Instead, I constructed the Nutty Wing Jig.

Using the Nutty Wing Jig, I completed the rib and spar assembly with little effort. No problems were encountered, except for the occasional rib that had a slightly undersize spar slot. Using my left index

finger to hold the rib steady in the jig, I enlarged the slot with a file.

Because the jig is so versatile, I'll be able to use it to construct many models. I won't go into it here, but I suspect that with a little modification of one rod support angle (B), the jig may even take care of wings that have moderate, uniform tapers.

Figures 1 through 4 show all of the jig's components. But here are some helpful comments on jig flexibility and on assembling and using the jig.

## FLEXIBILITY

The use of nuts and washers (Figure 3, E) on a threaded rod (Figure 3, D) provides several options. The nuts and washers act as clamps, and they can accommodate a variety of thicknesses of wood. They can be positioned left or right. The ribs can be installed in the clamps fairly rapidly and can also be removed quickly. They can be installed top side or bottom side up. The bottom-side-up feature is very helpful when you assemble under-cambered wings or wings with the spars slid into the bottom of the ribs.

Rod support angles (Figure 3, B) are made with several holes for the support rods (D and F) to accommodate a variety of wing chords and to yield the best rib support positions. If necessary, you may elongate the base mounting holes and/or the rod mounting holes of one or both rib support angles so that you can angle

them to support wings of decreasing chord toward the tips. Wings that have a moderate taper can be assembled if you shim one rod support angle (or use an angle of greater height and slot the rod support hole).

## ASSEMBLY

The first time the nuts and washers are installed on the threaded rod (which probably needs to be done only once), some patience is required. There are a lot of nuts and washers to "load" onto this rod. You must install the nuts and washers in pairs, i.e., nut and washer; washer and nut; otherwise, there's no "vise" action and no precise alignment function. If there's an error in the sequence, you'll have to remove a batch of nuts and washers from the rod to correct the error.

To stabilize the jig, install eight to 10,  $3/4$ - to 1-inch diameter cork, felt, rubber, or non-skid plastic pads under the jig base.

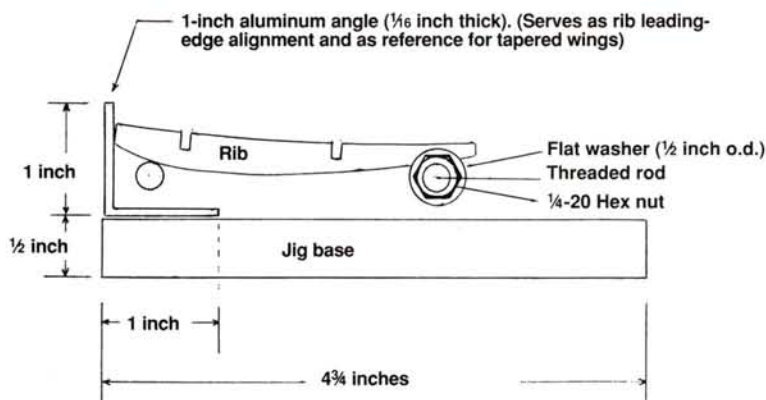
## USE

Lay the ribs (top or bottom side up) between two washers. Use your fingernail or a toothpick, if necessary, to open any closely spaced washers, or simply enlarge the space by rotating a nut. Adjust the nuts on each side of the pairs of washers and align where desired; use your fingers to tighten the nuts. Make sure that the rib is placed where you want it (spacing), and

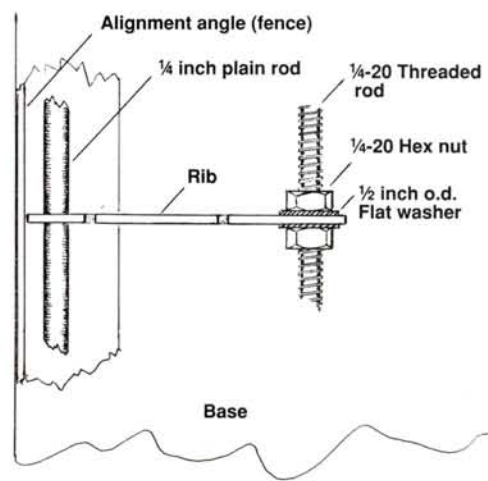


**FIG. 1****The Nutty Wing Jig**

Side view of one 1/12-scale  
Sopwith triplane  
Rib clamped in jig

**FIG. 2****The Nutty Wing Jig**

Top view of one 1/12-scale  
Sopwith triplane  
Rib clamped in jig



## MATERIALS, ALTERNATES AND NOTES

**A. Base:** flat, 1/2- to 3/4-inch-thick plywood, pine, Douglas fir, basswood, etc., 38 to 42 inches long. Seal and paint the wood to prevent it from warping.

**B. Rod support angle(s):** 3/4-inch aluminum angle, 1/16 inch thick, 7 inches long. Drill 1/4-inch-diameter holes in the vertical leg(s) for holding the support rods (D and F). Make another pair the mirror image of the first.

**C. Alignment fence:** 1-inch aluminum angle, 1/16 inch thick, 34 inches long. Fasten to the base with two (or more) screws. Screw slots may be elongated to permit in/out adjustment.

**D. Support and clamp rod:** 1/4-20 steel rod, 36 inches long (sometimes referred to as "all thread").

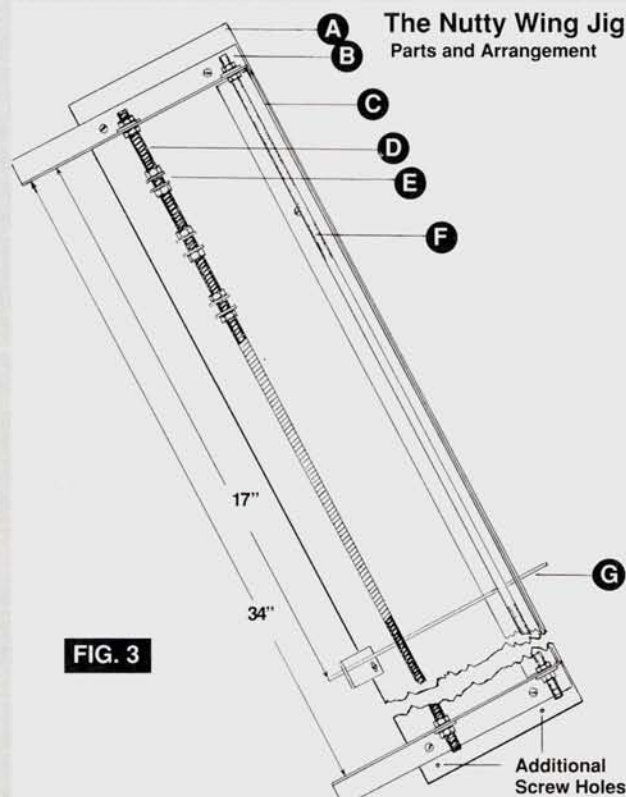
**E Nut and washer pairs:** 1/4-20 hex nuts and flat washers. The washers should be approximately 1/2 inch o.d., with a clearance hole (loose enough to prevent the washers from getting hung up on the rod threads, but tight enough to avoid a sloppy fit) for the 1/4-20 threaded rod. The nut and washer pairs create a series of movable clamps! Load the 1/4-20 threaded rod with enough pairs to hold all the ribs of the wing. (The top wing of the 1/12-scale Sopwith triplane

that I built using the jig required 27 pairs—54 nuts and washers.) You'll need four to eight additional nuts and washers to fasten the jig's 1/4-inch support rods to their support angles (B).

**F. Plain support rod:** 1/4-inch-diameter steel rod. The rod may be threaded on

each end for a slight distance sufficient to nut-clamp it to the two rod support angles (B). If threading the ends of this plain rod is a problem, select either end of it, and drill two holes through it—one close to one side of the support angle (B) and one on the other side of the same support angle. Install cotter pins, brads, or finishing nails in the holes. The idea here is to prevent any side-to-side movement of the plain support rod, while still allowing you to remove it easily (for another wing).

**G No "sag":** the 1/4-inch-diameter steel rods are sturdy, but their length permits some sagging, so a center support is prudent. Pass a 3/16-inch-diameter steel rod through a selected hole in the alignment fence (C) under both support rods and into a hole in a short piece of angle at the rear of the jig. In case a nut and washer pair need to be positioned at that point, some side-to-side adjustment of the rear angle is possible (because of a slotted screw hole in the angle's base). As an alternative, install a hex-head or pan-head sheet-metal screw (no. 8 or no. 10) under each support rod and adjust the screw(s) to support each rod.

**FIG. 3**



# FLIGHT INSTRUCTORS NEEDED



The AirCore 40 Family Trainer

Dear Fellow Modeler:

If you are an experienced modeler, no doubt you remember your first days in the hobby. Chances are, some nice modeler reached out and lent you a hand, offering advice, guidance and a little moral support. Isn't it time you returned the favor?

**GIVE THE GIFT OF FLIGHT** - This year, why not bring someone new into the hobby, or be that special friend. Many people want to learn our hobby, but they need a little encouragement and someone like you to answer questions and get them started. If you invest a little time, and give back to the hobby some of what it has given to you, you will be rewarded many times over for your effort.



The Barnstormer 40 "Bullet Proof" Biplane

Our mission at U.S. AirCore is to help people learn to fly, and supply them with rugged planes that survive their learning experience. (We even offer a crash-guarantee\* on the AirCore 40 Family Trainer.) Regardless of your airplane preference, we hope you share our belief that there are few hobbies offering the friendship, enjoyment or education that modeling has to offer.

*George Barker*      *Lawrence Ragan*

George Barker

Lawrence Ragan

**U.S. AirCore**  
Model Aircraft Manufacturing

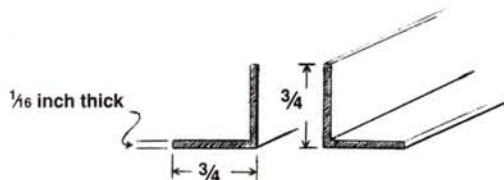
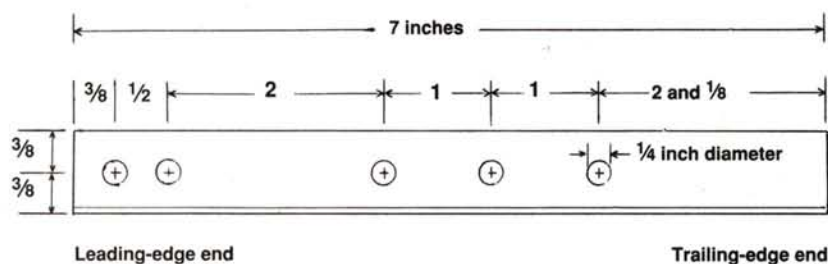
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Dallas, TX 75248  
214-250-1914

\*Call or send for details of the crash guarantee. See your local hobby dealer for AirCore kits. New VHS Video Catalog available for \$7.00 plus \$3.00 shipping

FIG. 4

## The Nutty Wing Jig

Part B Arrangement of rod support angle(s)



that the rib's end (leading or trailing) is against the alignment fence (Figure 3, C). Then place a  $\frac{7}{16}$ -inch wrench on one of the pairs of nuts to keep it from moving, and tighten the other nut using another  $\frac{7}{16}$ -inch wrench. After you've done this a few times, the procedure will become easier.

### RIB SPACING

You can space the ribs in several ways:

- If you're building from plans, you can use tracing paper (or thin typewriter paper) to

copy the rib spacing. Then, cut the copy and lay it flat on the jig base (Figure 3, A), between the rod support angles (B) and under the support rods (D and F). To keep the copy from moving, tape its edges to the jig base.

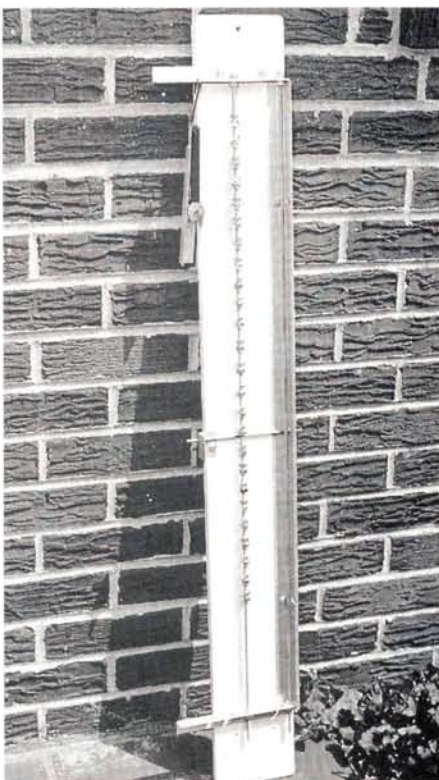
- If you have no printed plans to copy, but you know the rib spacing you want, just draw the placement lines on paper, and put it on the base under the support rods as mentioned above. Since the paper lies so close to the rib support rods, you'll be able to align the ribs accurately.

- Although it takes a little more time, another method is to simply lay the starting rib in place and fasten it. Then use a ruler to measure the desired space, place and fasten the next rib, and so on.

- Perhaps the fastest and most precise method of all is accomplished by making a spacer (wooden block, matte board, etc.) that's the width of the spaces between the ribs. Fasten the first rib in place. Hold one edge of the spacer against the first rib, install the next rib, push it against the other edge of the spacer and fasten it. Continue until all the ribs have been fastened. Fasten a tab to the spacer so that you can easily remove it from between two fastened ribs.

### CONCLUSION

If you usually assemble wing ribs and spars using the rod-through-the-rib alignment method or the punch-in-the-pins method on a flat building board, I urge you to consider the Nutty Wing Jig. I think that the first time you use this jig, you'll be pleased with the speedy assembly (particularly if you use CA) and with the precision you'll achieve.



This wing jig is easy to store, too.



PHOTOS BY TIM DIPERI



Team Kyosho's Dwight Shilling hovers his Kyosho .30 Concept SR in the FAI class.



Thirteen-year-old Scott Grey uses this new Kait .30 Enforcer SR heli for both sport and competition flying. Watch out for this new flier. After flying for only four months, he was good at switchless, inverted flight!

# 4th Annual Kyosho Heli Challenge

by TIM DIPERI

**F**OR FOUR YEARS, modelers have come from all over the United States to participate in the biggest "little" helicopter contest. At this year's event on June 19 and 20, all but one of the U.S. helicopter team (who will compete for the world title) competed in this exclusive contest for 30-size helis. Only a short time ago,

helicopters of this size were used only for training beginners. Today, almost every heli modeler from rank beginners to pilots of the highest ability fly these machines for fun and competition.

Kyosho\* heli product manager Tim Lampe has been the contest director since the event's inception. This



As usual, Mike Mas did some great flying at the event. Here, he hovers his Hirobo Shuttle ZX.



Flying team Wendell and Leisa (caller) Adkins fly Wendell's X-Cell .30. Equipped with a M.A.S. Zephyr fuselage and powered by an O.S. 32H engine, the heli performed well, and Wendell took first place in the FAI class.



## Fourth Annual Kyosho Heli Challenge Winners

PLACE	PILOT	MODEL
<b>Class I</b>		
1	Dean Kepler	X-Cell
2	David Diehl	Concept 30
3	John Gelsimino	Concept 30
4	Kiyoshi Murata	Concept 30
<b>Class II</b>		
1	Jeff Reed	Concept 30
2	Patrick Connell	Concept 30
3	Mark Potts	Concept 30
4	Dave Storey	Concept 30
<b>Class III</b>		
1	Paul Soha	X-Cell
2	Mike Fortune	X-Cell
3	Norm Lobhart	Concept 30
4	Bob Akers	X-Cell
<b>FAI</b>		
1	Wendell Adkins (U.S. team member)	X-Cell
2	Dan Chapman	X-Cell
3	Tom Dooley	Hirobo Shuttle
4	Wayne Mann (U.S. team member)	X-Cell



**Class I winners (left to right): Kiyoshi Murata, Dave Diehl, Dean Kepler and John Gelsimino.**

year's edition was extremely well-organized and ran very smoothly. Hats off to Tim and his loyal colleagues!

### FANCY FACILITIES

The flying field is what you'd expect to find in model heaven! It wasn't enough to have plenty of open space and a convenient parking area. This field has a building to impound radios and provide secure storage of equipment. In addition to the four paved runways, there's a large outdoor covered picnic area. Talk about the life! Maybe next year they'll put in a driving range.

Tim set up three flight lines to allow everyone to get lots of flying in. I can speak from experience; I don't like traveling to any contest for only one or two flights.

### MANUFACTURERS' ROW

Not only were the participants serious about this contest, but virtually all of the helicopter manufacturers came with their sponsored pilots and products.

Miniature Aircraft\* flew in force with their X-Cell. It has a larger main rotor disk and tail boom, and because it's slightly heavier than most other helicopters, it flies very well. The X-Cell .30 has many of the items that the .60 machine offers, including main- and tail-rotor mechanisms. I even noticed several of these helicopters using the carbon-fiber upgrade available from M.A.S.

Kalt\* helicopters were used in all classes. Pilot Scott Grey put on a switchless inverted demo that was very impressive. After the



**Class II winners (left to right): Dave Storey, Patrick Connell, Jeff Reed and Mark Potts.**



**Class III winners (left to right): Bob Akers, Mike Fortune, Paul Soha and Norm Lobhart.**

demo, I spoke to the 13-year-old and was amazed to find that he had been flying for only four months. Watch out for this kid!

Team Hirobo\* arrived with pilots Mike Mas and Tom Dooley. Tom flew box-stock Hirobo Shuttles powered by Enya\*.35s and placed third in FAI. Mike, also using an Enya .35, flew a "Gold" Shuttle that sported all the goodies that Hirobo has to offer.



**FAI-class winners (left to right): Wayne Mann, Dan Chapman, Wendell Adkins and Tom Dooley.**

Finally, Kyosho came out with FAI team pilots Dwight Shilling and Stan Oslaski. Both flew Concept SRs; Dwight used a Super Tigre\*.34 and Stan, an O.S\*.32. Using a Concept .60, Dwight performed some very impressive 3D (hot-dogging) flying during lunch breaks on both days. Tim Lampe displayed some of the Zeal\* high-performance parts, such as a new metal rotor head for the .30 helicopters—very nice!

Pilots used a variety of equipment. Most of the radio equipment was manufactured by Futaba\*, and there were a few JR\* and Airtronics\* systems. In fact, this was the first contest (except for the team trials) in which the new Futaba 9VHZ system was used in force. This radio is considered to be the best of the best.



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(All wood - no foam - Goldberg covering)



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## Giant Scale TR-260 Kit

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## New Giant Scale Cap 230 Kit

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## HELI CHALLENGE



*The facilities this year were the greatest. Shown here is the radio impound and equipment storage building. The large covered pavilion in the background was a great place to rest and take in the action.*

### SPECIAL THANKS TO THE SPONSORS WHO MADE THIS EVENT POSSIBLE:

**Airtronics Inc.  
Bergen Machine & Tool  
Futaba Corp. of America  
Horizon Hobby Distributors  
Miniature Aircraft USA  
Model Airplane News  
Raves Mfg.  
Robert Mfg.  
Yale Mfg.**

Engines were limited to size, not manufacturers. The big three were O.S., Super Tigre and Enya, and no single one outperformed the others.

As I looked around, I saw most of the people using Cool Power fuel manufactured by Morgan\*. In fact, most of the FAI flyers used a high-nitro/high-oil mixture. The .30 helicopters really go with higher nitro.

Rotor blades were another item of interest. Many helis had stock blades, and I saw quite a few Hi-Products rotor blades. These blades seem to fly very well and increase forward speed.

I had a chance to see JR's solid-state gyro when Mike Fortune used it in Class III. He found that it performed well in windy conditions.

### ON THE FLIGHT LINE

There was continuous flying on both days. One thing that surprised me was the number of crashes—many in FAI. It's obvious that we've been spoiled by the high inertia during autorotation of large helicopters. Most of the crashes that I saw occurred while the pilot was dragging an auto to the landing pad, then boom striking.

Saturday afternoon was the most exciting time (for flying) for me. FAI was the only class that was left to fly, and tornadoes were in the vicinity. The wind really started to

pick up, and I was fifth to fly. I got through it OK with lightning-fast downwind performance and multi-minute upwind maneuvers. By the time Mike Mas started to fly, the sky had opened up. With winds that were moving lawn furniture around, Mike saved his model, and Tim Lampe called the round to run for cover. It was fun, and as we were all in line to fly, the joke was, "This is what separates the men from the foolish men."

On Sunday afternoon, awards were presented to the top four finishers. Each first-place winner also received a Kyosho Concept .30 kit! This is certainly one of the most impressive prizes I've ever seen.



*Team Kyosho (left to right): Stan Oslaski, Tim Lampe and Dwight Shilling.*

Whether you're a novice pilot or an expert, this is one event I recommend that you attend. Make it next year if you can!

\*Here are the addresses of the companies mentioned in this article:

**Kyosho/Great Planes Model Distributors**, P.O. Box 9021, Champaign, IL 61826.

**Miniature Aircraft USA**, 3743 Silver Star Rd., Orlando, FL 32808.

**Kalt**; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821.

**Hirobo**; distributed by Altech Marketing, P.O. Box 391, Edison, NJ 08818-0391.

**Enya Model Engines**; distributed by Altech Marketing.

**Super Tigre/Great Planes Model Distributors**.

**O.S./Great Planes Model Distributors**.

**Zeal**; distributed by Great Planes Model Distributors.

**Futaba Corp. of America**, 4 Studebaker, Irvine, CA 92718.

**JR Remote Control**; distributed by Horizon Hobby Distributors.

**Airtronics Inc.**, 11 Autry, Irvine, CA 92718.

**Morgan Inc.**, P.O. Box 1201, Enterprise, AL 36331.



## TAIL DESIGN

(Continued from page 41)

is at 27 degrees—both at a lift coefficient of 1.2. Thus, at AR5, the tail surface responds more quickly to changes in angle of attack than at AR2.5 since the lift per degree of angle of attack is greater.

However, for smaller models, the tail's chord should not be less than 5 inches, to avoid unfavorable low Reynolds number effects. An aspect ratio of 4 to 5 with constant chord is recommended.

### SLOTTED-FLAP EFFECT

When slotted flaps are fully extended, several things occur:

- Both lift and drag increase substantially, and the model's speed decreases.
- The wing's nose-down pitching moment increases sharply.
- The downwash angle also increases in proportion to the lift increase from the lowered flaps. This increases the horizontal tail download.

Recent experience with three models (the

Seagull III, the Seahawk and the Swift) indicates that the flap chord (in percent of the wing's chord) influences the model's flap-down behavior.

Flaps with wider chords—up to 30 percent of the wing's chord—generate very little pitch change when extended. The increase in tail download that tends to cause a nose-up reaction is equalized by the wing's higher nose-down pitching moment. It is very satisfying to lower full flap, after throttling back, and have the model continue on its merry way, without nosing up or down, but flying very noticeably slower.

For narrower chord (25 percent) flaps, the flap-induced tail download is greater than the nose-down wing pitching moment. When the flaps are extended, this causes the model to nose up sharply and rather alarmingly.

Part 2 will continue this discussion with ground effect, elevator sizing and different CG locations.

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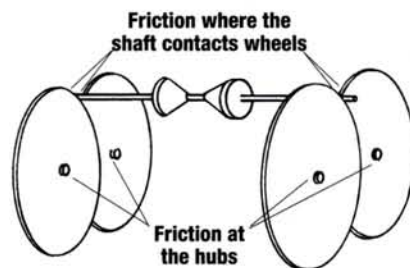
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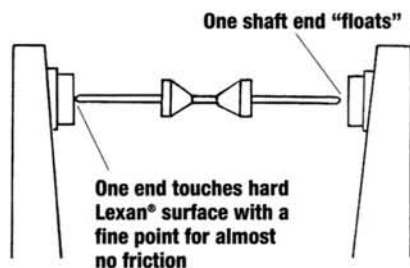


## Top Flite's new magnetic balancer eliminates 7 out of 8 friction points.

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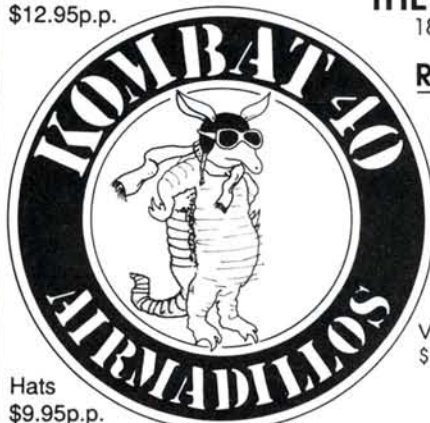
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# ROTARY-WING ROUNDUP

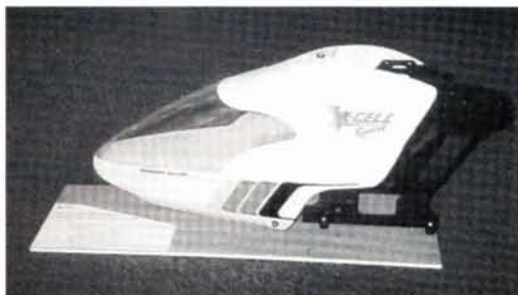
## NEW HELI PRODUCTS

### MINIATURE AIRCRAFT USA X-Cell Sport Epoxy Glass Canopy

The X-Cell Sport canopy set has a design that's similar to that of the XL-Pro canopy. The one-piece, lightweight set features an epoxy/glass and rubber-isolated construction. The kit includes three rubber isolators, three canopy studs and a clear Lexan window set. It fits .50/.60 series X-Cells that have a no. 0575 plastic servo tray, and it will fit the original wooden tray if the tray is modified slightly. It includes all the necessary hardware.

**Part no.**—0504; **price**—\$69.95.

**Miniature Aircraft USA**, 3743 Silver Star Rd., Orlando, FL 32808; (407) 292-4267.



### REVOLUTION Precision Blade Balancer

The Revolution Blade Balancer offers a quick, easy and economical way of precisely balancing main- and tail-rotor blades.

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**Part no.**—RVO 1001; **price**—\$24.95.

**Revolution**; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511.



### ALTECH MARKETING SST Shaft and Belt Tail-Drive Sets

Altech offers these upgrade parts for your .60-size helicopter. The shaft tail-drive set consists of a counter-gear set, a tail mount and a metal tail-rotor gearbox.

The counter gear is mounted on a reinforced-plastic housing that reduces the electrical noise created by the precision bevel gears. The shaft drive uses a

2mm wire shaft (not included) that's connected to a rugged, metal, tail-rotor gearbox. The blade holders have thrust bearings for smoother, faster pitch motion. The linear pitch lever also allows precise control.

The counter gear of the belt tail-drive set has a similar plastic housing, and the tail-drive gearbox has an open metal frame that allows easy inspection of the belt drive. The same blade holders and pitch-change mechanism are provided with the toothed, reinforced belt.

**Part nos.**—0404939 (SST shaft tail drive); 0404940 (SST belt tail drive); **price**—\$156.95.

**Altech Marketing**, P.O. Box 391, Edison, NJ 08818-0391; (908) 248-8738.



Descriptions of new products appearing on this page were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute an endorsement by **Model Airplane News**, nor does it guarantee product performance or safety.



by FAYE STILLEY

# Field Box with a New Slant



EASE THE LOAD WITH THIS COMPACT DESIGN



**L**IKE MANY, I've gone through the typical progression of field boxes as I've become more proficient in this hobby. First came the cardboard box, which I replaced with a wooden one when I purchased a 12V battery and a starter. Then I moved on to a small kit box when a power panel and an electric fuel pump showed up one Christmas. Eventually, I built a very large box

with for a long time. It had to be compact (it was not going to hold the fuel can) and, because I was taking the time to build yet another box, I wanted it to look good.

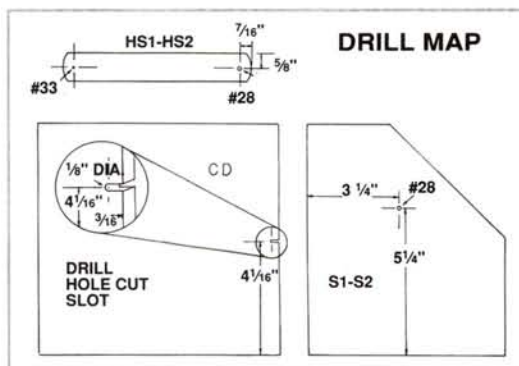
After many hours of sketching and measuring, the final design had a new slant. Once the design process was complete, it didn't take me long to complete the project.

## FEATURES

- This field box has a cover. It looks a lot better than those open boxes that have everything sticking out in all directions.
- When the front cover is opened, a mercury switch in the cover automatically turns on the power panel. More important, the power panel automatically shuts off when you close the box. (Many power panels will drain your battery if you forget to turn them off.)
- The front cover houses

also has a strip of magnetic tape to grip those small screws and spark plugs so they don't "jump" into the grass and disappear.

- The box can be carried with the cover open.
- When the tool-compartment floor is removed, the 12V battery is accessible. I use a sealed lead-calcium battery. If an unsealed battery was used, the battery compartment would have to be vented. Some provision would also have to be made to catch overflow. I installed an additional banana plug in the power panel so that I could bypass the panel circuitry and charge the battery from the panel without removing the tool-compartment floor.



to accommodate all the "necessary" stuff for several airplanes.

One hot summer day, while I was carrying an 80-pound box and an airplane through a dirty field, I decided that there must be a better solution. This "arm stretcher" I was carrying was not only too big and heavy, but it also held the fuel can with all the electrical equipment. Before I reached the pit area, I had made up my mind to build a new one—one that I could live

the power panel, the ESV and six glow plugs. With the cover open, the starter is accessible, as is the glow-plug connector, the ESV wires, a Ni-Cd (pocket-type) glow-plug battery and an extra cone for the starter.

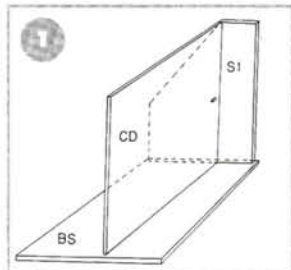
- The open cover forms a tray with a raised edge around it to prevent tools from rolling off. It



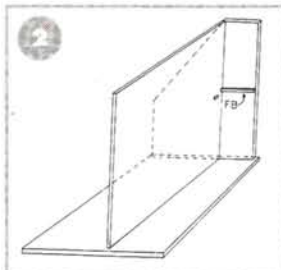
*This is the standard equipment that I carry in my box, and there's actually room for much more.*



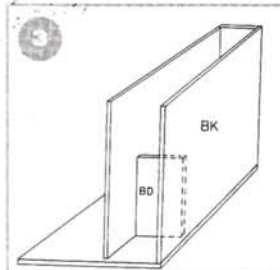
# Field-Box Assembly



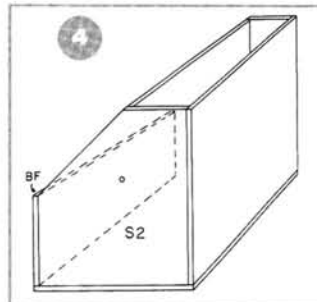
Start by gluing CD, BS and S1 together as shown. Note that they square up as they're placed together. Use a square to make sure that everything remains square as the glue dries.



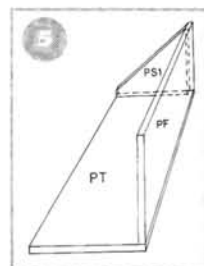
When set, the tool-compartment floor support (FB) should be glued into place before the back of the box is in place.



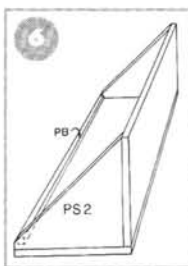
Add the battery-compartment divider (BD) and the back panel (BK). Having the center divider (CD), the base (BS) and the left side (SL) already in place will help you square-up the new pieces. But, use a square to be sure.



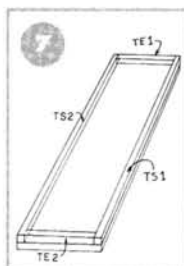
When set, the right side (S2) and the front (BF) can be glued in place.



The panel enclosure is built using the same techniques as the base box. Start with the top (PT), the front (PF) and the left side (PS1).

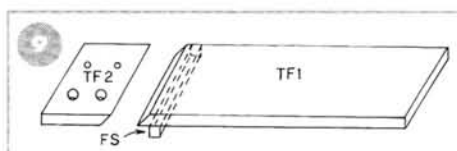
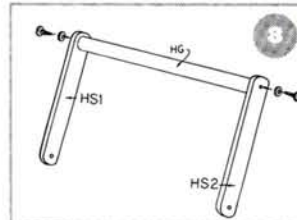


When set, the right side (PS2) and the 1/4-inch-square stock that forms the back (PB) are added.

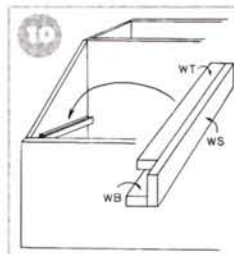


To make the tool-compartment cover, attach part TE1 and part TS1 to the top (TC) as shown; then add the other two pieces.

The handle side pieces (HS1 and HS2) have holes drilled on center, 7/16 inch from each end. The hole that's used to fasten the handle to the box should be 3/64 inch in diameter (size no. 28). Place a screw in the other hole (7/64 inch in diameter, size no. 33) and insert the screw into the dowel grip (HG). Both sides can be glued and screwed onto the dowel at the same time. Use no. 4 round-head wood screws and a washer. Drill pilot holes into the dowel ends before assembling. Make sure that the sides are square with each other and with the dowel.

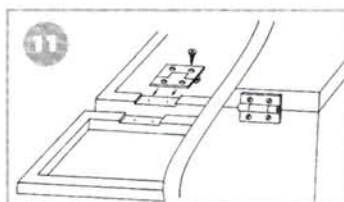


The tool-compartment floor (TF1) requires a stop (FS) to keep it in place when the door (TF2) is upright. Position the stop 1/4 inch back from the beveled edge, then glue it to the bottom of the floor (TF1). Make sure that it's parallel to the beveled edge.

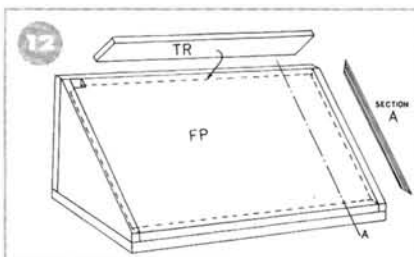


The cover for the wire that runs from the battery compartment to the power-panel enclosure is made of 1/8-inch hardwood. Three pieces are used: top (WT), bottom (WB) and side (WS). The top piece (WT) is shorter than the other two to allow space for the wire to exit. Install the wire cover in the box. Be sure that the channel in the cover is in line with the slot in the center divider (CD). The top of the wire cover fits flush with the top edge of the box's

front panel (BF). Rub the inside of the channel with soap or candle wax. This will help when it's time to install the wire. Use the epoxy sparingly, and don't let it run into the channel.



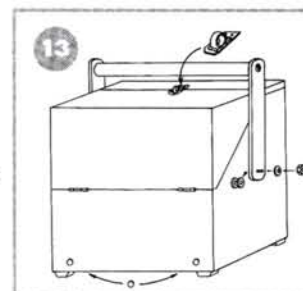
Hinges can be installed flat on the box or inset into the wood. Inset hinges require a little extra work; you'll have to create slots that are the thickness of the hinge. Install the hinges 1 inch from the edge of the opening. The inset technique is shown on the left.



Once you've cut the appropriate size opening(s) for the power panel and the ESV (if you're installing one) and drilled the holes for the glow plugs, you can install the face panel (FP). Because it fits into the panel enclosure, dry-fit it first. When you're satisfied with the fit, glue the panel in place. Then add the transmitter rest (TR). It fits flush with the top edge of the face panel, and it's centered.

After the face panel has been installed, remove the hinges, finish-sand, and paint or varnish the box. Run the wire from the battery compartment to the power panel. Install the hinged covers and the large "feet." The small "feet" serve as bumpers so that the open covers don't rest against the box.

The "bumpers" on the back of the box keep the tool tray level when it's open. They should be about 1/8 inch thick. The large, 1/2-inch-thick bottom feet can also be installed now. Finally, install two more bumpers on the front of the box, and install the handle using 6-32 machine screws. (Screw these through the sides of the box from the inside.) Add washers between the handle and the box. Fasten the handle with a washer and a wing nut. Add a latch or hasp to keep the covers closed.



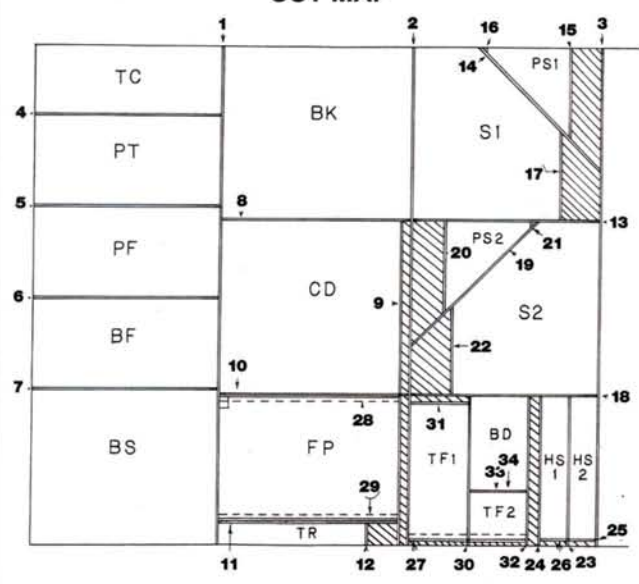


## PARTS MAP



ORDER THE FULL-SIZE PLAN...PAGE 108...FSP1932...\$6

## CUT MAP



## MAPS

Before you cut anything, make sure that the table-saw blade is perpendicular to the table. Then cut out all the pieces and drill all the required holes before you glue anything. The cut sequence and parts maps show you how to cut the wood so that the grain is consistent. By using the maps you'll also minimize waste. The cutting sequence is indicated by the circled numbers. This is very important. The 1/4-inch-thick stock required is 24x28 inches. Blades

will vary, but if you use a typical plywood blade, the kerf cut will usually be 1/8 inch or smaller. If the kerf is greater than 1/8 inch, a larger piece of wood is needed. Scrap is indicated with shading on the map.

Start by cutting three panels, each 9x24 inches long (cuts 1, 2 and 3). Measure accurately before each cut is made to allow for the previous kerf. When you have completed cut no. 11, the piece for FP will be unfinished; put it aside for later. It needs two more cuts at a 45-degree angle, which you'll make when you cut the 45-degree angles on pieces TF1 and

TF2. (Note: the notch in FP is cut when FP is cut out to suit the power panel.) Cuts 27, 28 and 29 are all at 45-degree angles. The measurements on the plan are for the long side of the 45-degree cut. The dotted lines indicate the cut slants inward to the bottom surface. Make cut 27 (45 degrees) as close to the edge of the wood as possible. After the 45-degree cuts have been made, square up the saw, and make cuts 4 and 5.

The last cut (33) should be made 2 1/4 inches from the long side (top side) of the 45-degree cut on TF2. It

may not give the exact measurement for BD (4 1/2 inches). Another cut (34) may be needed to trim BD to exact size.

Shaping the handle sides (HS1 and HS2) is all that remains before drilling HS1, HS2, CD, S1 and S2. (Refer to the drilling map.) Drilling TF2 for screwdrivers is optional.

## CONSTRUCTION

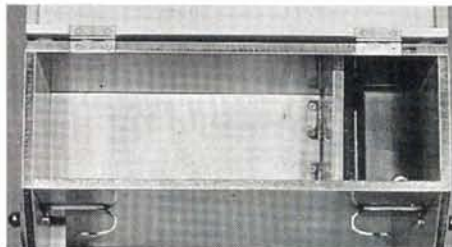
Remember that the box must be square; otherwise the cover will not close properly.

## HARDWARE

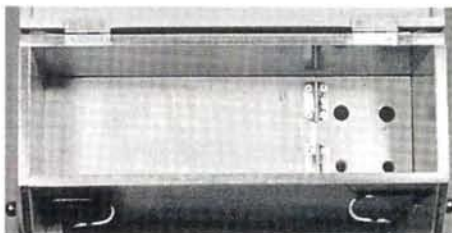
Qty.	Description
4	1/4x1-inch hinges with screws
1	small hasp/latch to suit
8	rubber feet (4 large, 4 small)
2	no. 4 wood screws
2	5/32x3/4-inch machine screws & nuts
2	alligator clips (small, red/black)
2	no. 4 washers
6	no. 6 washers
1	16- to 18-inch zip cord
1	mercury switch (optional)

Building a straight, square airplane is one thing, but putting together a square box will test your skill.

If you plan to finish the inside, sand those surfaces now. You won't be able to later. If the pieces have been cut square, you'll be able to glue two or three pieces at a time. The first pieces are the most important because



The hinged floor of the tool compartment gives you two options: one configuration is for tools placed horizontally; the other configuration is for items placed upright, e.g., a tachometer, small props and epoxy.



Screwdrivers are within easy reach when you store them as shown.

they form a frame for the rest. Begin with the base (BS) and the center divider (CD) and the left side (S1). As you press these pieces together, they should be square with each other but, to ensure accuracy, check everything carefully with a square. Wood glue may be used, but epoxy sets faster and doesn't require clamping.

The box has proven to be a good friend at the field. It even rides securely in the car because most of the weight (battery and starter) is in the bottom of the box. The overall dimensions are 9x7 1/2x9 inches. Fully loaded, it weighs just 14 pounds. I hope this new field box adds to your modeling and flying fun.

## HARDWOOD

Qty.	I.D.	Description	Stock
1	PB	panel encl.	8 1/2-inch long x 1/4-inch square
2	TE1-TE2	tool comp. cover ends	2 3/4-inch long x 1/4-inch square
2	TS1-TS2	tool comp. cover sides	9-inch long x 1/4-inch square
1	FS	tool comp. floor stop	2 3/4-inch long x 1/4-inch square
1	FB	tool comp. floor support	2 3/4-inch long x 1/8-inch square
1	WT	wire cover top	3 3/4-inch long x 1/8x1/4-inch
1	WB	wire cover bottom	4-inch long x 1/8x1/4-inch
1	WS	wire cover side	4-inch long x 1/8x3/8-inch
1	HG	handle grip	9 1/8-inch long x 3/4-inch-dia. dowel



# ACE PuddleMaster

by BERNARD CAWLEY JR.



PHOTO BY ROY INMAN

## Electric flying boat



Three PuddleMasters at the 1993 PSEMF Electric Fly-In. Left to right: Bernard Cawley, Ben Almojuela and Jack Aldridge. (Photo by Darrell Cawley.)

**F**OR A NUMBER of years now, electric-flight columnist Mitch Poling (now with *Model Airplane News*) has been extolling the virtues of flying electric models off water. To that end, he has published several designs for electric seaplanes. Scott Hartman, of Fritch, TX, was inspired by one of Mitch's designs and by Laddie Mikulasko—another water-flying proponent—to create a design that was recently kitted by Ace R/C\*. The PuddleMaster is a compact, 3-channel, electric flying boat for 6- or 7-cell power systems using either ferrite or cobalt motors.

I'm a longtime electric modeler, but despite Mitch's urgings, I had never tried float flying. At the Northwest Model Expo in Puyallup, WA, this January, I saw a prototype PuddleMaster at the Ace booth. This thing looked like just the ticket to turn my curiosity about water-based flying into reality, so I ordered one at the show. Also, it was billed as an amphibian, and that gave me thoughts of flying it where I usually fly and of taking it on family trips.

### THE KIT

The kit arrived a few weeks later. Inside, I found cleanly die-cut balsa and ply parts, complete control hardware, and balsa and spruce sticks rolled inside three sheets of printed plans and instructions.

The sheet balsa, especially the wing ribs, was generally heavier than I would have chosen, and the fuselage sides didn't match too well for density and stiffness, but I didn't feel compelled to replace any parts. (Read that as: I was too lazy to make new parts.) The three plan sheets showed:

- a full-size layout of both wings;
- a set of building instructions and a full-size stabilizer plan;
- a  $\frac{3}{4}$ -scale layout of the rest of the plane.

The kit-box contents matched the supplied materials list, but the list calls for four balsa wing-spar pieces, and only two are needed. I also felt there wasn't enough  $\frac{1}{16}$ -inch sheet balsa, but found there was more than enough  $\frac{3}{32}$ -inch sheet when I framed up the plane.

I was mildly disappointed to learn that the



"amphibian" provisions were limited to suggesting that you make the wing floats removable by attaching them with Velcro®-brand fastener (which I did) and that you hand-launch the plane and belly-land it on grass.

The plans also suggested that you mount a pair of wheels to the bottom of the hull with two landing-gear clips and screws that go up into a plywood plate inside. This would leave holes in the bottom of the hull when the wheels are removed for water operation.

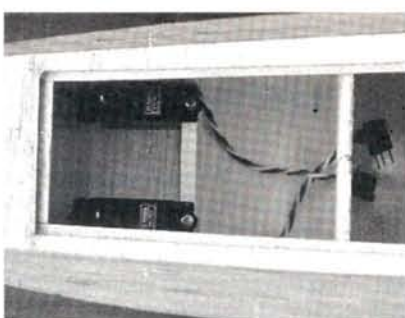
## CONSTRUCTION

The PuddleMaster's structure is very basic: a sheet-balsa fuselage/hull and vertical tail, a horizontal tail built mostly out of 3/16-inch-square balsa sticks, and a single-spar wing with a sheeted center section. The only unusual construction feature is the laminated wing spar, which is made of two spruce spar caps and a balsa core.

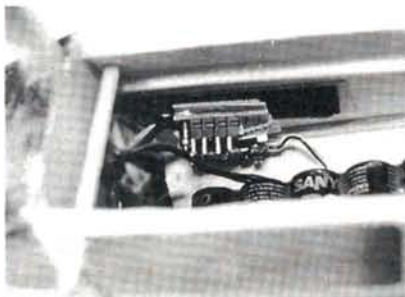
Following the construction sequence on the plan sheet, the kit goes together pretty easily. I only had to do some minor trimming to improve the parts fit (spar notches in ribs) and a little sanding (to match the fuselage sides).

I did find a couple of minor first-run kit glitches in the instructions.

- You're told to drill holes in the formers for pushrods at "tic marks" that aren't there.
- It's suggested that you use the fuselage top view to align the assembled unit before you



The servo installation in the forward compartment. (Photo by Ben Almojuela.)



The speed controller and battery installed in the main compartment. (Photo by Bernard Cawley.)

stiffen them. By the way, the designer tells me he runs the outer rods almost all the way back to the control surfaces.

## FINISHING

I painted the exposed wooden parts with Coverite's\* 21st Century spray paint. Then, after giving the entire airframe a coat of Coverite Balsarite for Film (hoping to ensure a watertight covering job), I covered my PuddleMaster with 21st Century film. I topped this off with logos from the supplied sheet and matching, custom-cut AMA numbers from a local sign shop. For trim, I used MonoKote\* trim sheets and Coverite Black Baron Presto.

## AMAZING ACE!

As this project was winding up, I had the opportunity to test an as-yet-unnamed preproduction prototype of a microprocessor-based speed controller from Ace R/C.

- It's compact—1x1x1 3/4 inches.
- It's reasonably light:
  - about 0.6 ounce (unwired);
  - 1.6 ounces with 8-inch-long Flexmaster power leads and Sermos connectors, plus the receiver lead.

- Its range is fixed—no adjustments.
- There's no momentary "blip" of motor power when the receiver is turned on, because each time the receiver/transmitter are powered up, it sets itself up so that the throttle stick setting at that time determines the "off" point. This arrangement means that regardless of the throttle-stick's



The new Ace R/C throttle, ready to use. Total weight—1 1/2 ounces. (Photo by Bernard Cawley.)

position, there's no way it can jump to high throttle on power up.

glue, but this didn't work too well with the 3/4-size view shown on the plans.

- There was a discrepancy between plans and instructions with regard to the pushrod exits at the aft end. The instructions tell you to cut the outer rod sleeves off flush with the top, but the plans show the outer sleeves extending aft a couple of inches. I cut them off flush with the top of the fuselage and wound up with an unsupported length of inner rod (i.e., protruding from the fuse) that was far too long for my liking. I put about 4 inches of metal pushrod inside the ends of the inner rods to

## SPECIFICATIONS

**Model name:** PuddleMaster

**Manufacturer:** Ace R/C

**Type:** electric seaplane

**List price:** \$49.95

**Wingspan:** 48 in.

**Wing area:** 408 sq. in.

**Weight:** 41 oz., as built

**Wing loading:** 14 1/2 oz./sq. ft.

**No. of channels req'd:** 3

**Recommended motor size:** 05

**Motor used:** Astro 035 cobalt

**Radio used:** RCD receiver, Ace Micro 380 servos, Airtronics\* SR transmitter, Flightec ESC

**Prop used:** 7x4 APC

**Airfoil type:** flat-bottom

**Washout:** none

**Wing construction:** built-up, single-spar balsa and spruce

**Kit construction:** all balsa/ply—sheet fuselage, fin, built-up stabilizer; optional accessories—none.

**Features:** the simple balsa (and a little spruce) assembly can be built quickly and easily. The kit includes all the necessary hardware. Equipment installation, both radio and power system, is straightforward, and there's ample room. Everyone who sees this plane (even the gas fliers) wants to try it.

## Hits

- Sparkling performance, even on "only" six cells
- Lots of fun, even in windy weather
- A good value

## Misses

- 3/4-size fuselage plan
- Some wood is heavier than needed (but it flies well anyway)
- Not as "amphibious" as hoped (no real provisions for wheels)

## EQUIPMENT

The power recommendation is a strong 05 motor and six or seven cells—specifically,

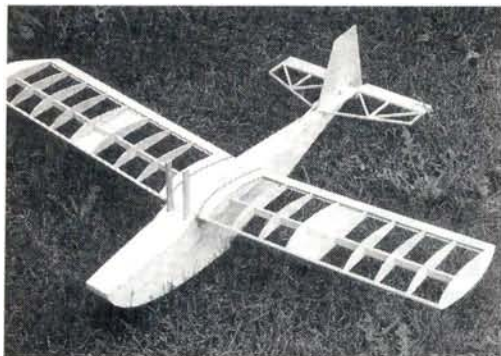
- Moving the rudder or elevator has absolutely no effect on motor speed, even at low throttle. In my experience, this is unusual.

- On the bottom of the circuit board, there's a plastic sheet that makes it easy to mount with sticky-back Velcro®-brand fastener.

Otherwise, it's much like other good speed controllers in operation—high rate and linear from low to high. It's supposed to be able to handle from six to 26 cells at up to 30A continuous current.

In flight tests, the throttle behaved well, and so far, it hasn't become too warm. It does just what's expected of it with little fuss or fanfare. The production version is targeted to sell for less than \$60. At that price, Ace has another winner here.



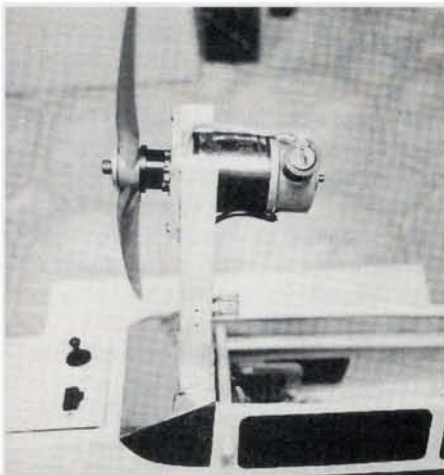


The assembled "bones." (Photo by Ben Almojuela.)

the Great Planes\* Goldfire, the Kyosho\* 360ST, or the Astro Flight\* cobalt 05. From experience I know that the Astro Flight cobalt 035 is as strong as most 05s on six cells, but lighter (2½ ounces lighter than a Goldfire). I had a 1987 vintage cobalt 035 on hand, so onto the PuddleMaster's motor pylon it went. The rest of the power system in my plane includes a Flightec\* SEC-I speed controller (wired in with Ace FlexMaster wire) and, mounted on one motor pylon, a homemade fuse holder for the miniature blade-type fuse. This allows me to use the fuse as an arming switch.

APC\* props are recommended for this project, and I concur. I use a 7x4 APC on the cobalt 035. Powered by six Sanyo 1400 SCRs, this combination runs initially at about 13,000rpm and draws about 26 amps (static), yielding an input power of just over 150 watts. This is more than enough power for a lively performance.

The airborne equipment fits in the two nose compartments (the servos in the front one and the receiver and battery in the next compartment aft). There's plenty of room for full-size components here, but don't use them: they're too heavy. Ace recommends that the total weight of the airborne radio system be kept to 6 ounces or less. Including



Motor installation: note fuse/arming switch on pylon. (Photo by Bernard Cawley.)

## FLIGHT PERFORMANCE

### • Takeoff and landing

Overland flying after hand-launching is easy: a few quick steps into the wind and a firm level toss get it going. On a breezy day, all it needs is a level toss into the wind. The wide fuselage is a bit hard to grasp, and you have to hold it just in front of the step to counterbalance its high thrust line. Once under way, it climbs with authority. Off water, takeoffs are easily done; it gets off in about 50 feet.

On land or water, landings are just a matter of lining up and flaring at the appropriate time. The rudder has enough authority, even at power-off glide speeds.

In displacement mode, water taxiing is also easy, thanks to the rudder extension below the aft end of the fuselage. It's an effective water rudder.

Using 1700mAh batteries and flying a mixture of full-speed aerobatics and just cruisin', my typical flight times are 4½ to 6 minutes. When flying off water, be sure to land before the battery is completely exhausted so that you'll be able to taxi back to shore!

### • High-speed handling

Initially, until it built up speed, my PuddleMaster tended to pitch down with the application of full power. After a few flights, I put a ¼-inch plywood shim between the lower edge of the motor-mounting plate and the spruce motor pylons. This increased upthrust slightly and moderated its pitch-down tendency. Scott Hartman says that you might have to adjust the thrust line slightly to suit the power and weight of the motor used.

### • Low-speed handling

The PuddleMaster can be slowed to amazingly low speeds. It maintains altitude at a less-than-half-throttle cruise. With power off, the glide is pretty flat, and stalls are gentle and straight ahead, or breaking slightly to either side. Recoveries are immediate with either power or forward stick.

### • Aerobatics

At speed, most 3-channel aerobatics are within the PuddleMaster's reach. It loops and snap-rolls easily. Slow rolls are harder, but a good pilot (better than me!) should be able to do them. It has one odd quirk, though. If it's held in inverted flight (which takes full down-elevator), it must be looped out—it won't roll out—so be sure to have enough altitude for a half-inside-loop recovery.

an RCD\* 535 micro receiver, two Ace Import Special Micro 380 servos, the speed controller, a 110mAh Sanyo receiver battery and the switch harness, my setup weighs 5½ ounces.

By the way, the servo mounting is clearly shown on the plans, and material for the servo rails is included. You're pretty much on your own for the rest of the installation. To mount the receiver, the receiver battery and the speed controller, I used sticky-back Velcro®-brand fastener attached to pieces of ¼-inch plywood, ¼ inch, in turn, were glued with CA to the inside of the hull. A similar setup secures the motor battery.

No control throws are suggested in the instructions. The designer recommends ⅝ to ¾ inch each way on the elevator and ¾ to 1 inch each way on the rudder—a setup that yields a responsive little flier.

Ready to fly, my PuddleMaster weighs 40½ ounces. The removable wing floats weigh 1½ ounces, so the "land plane" configuration weighs 39 ounces.

## FLYING THE PUDDLEMASTER

My PuddleMaster's first flight was on a blustery Friday evening before the Celebration of Silent Flight in Washougal, WA. Despite the intermittent rain, I wanted to fly it so that I'd be able to sign the AMA safety declaration the next day—and be able

to fly the plane, too!

When the weather improved enough to allow me to do a range check, I enlisted the help of another flier for the first hand launch. I soon found that I had nothing to fear from this ship. It needed some left trim to counteract a slightly misaligned vertical fin (blame the builder), and its power on/power off behavior was a bit different (because of its high thrust line), but I was soon feeling very confident with it.

A couple of weeks later, I flew it off water and found that it took off in short order and was a real kick, even with the extra weight and drag of the wing floats. After a couple of flights, I even had enough nerve to try my first water touch-and-go (fun stuff!). I'm looking forward to lots more fun with this one, off water and grass.

*\*Here are the addresses of the companies mentioned in this article:*

**Ace R/C Inc.**, 116 West 19th St., P.O. Box 511C, Higginsville, MO 64037-0472.

**Coverite**, 420 Babylon Rd., Horsham, PA 19044-1265.

**MonoKote/Great Planes Model Distributors**, P.O. Box 9021, Champaign, IL 61826.

**Great Planes Model Distributors** (see address above).

**Kyosho**; distributed by Great Planes Model Distributors (see address above).

**Astro Flight Inc.**, 13311 Beach Ave., Marina Del Rey, CA 90292-9021.

**Flightec**, 21 Juniper Way, Hamilton, NJ 08619.

**APC**; distributed by Landing Products, P.O. Box 938, Knights Landing, CA 95645.

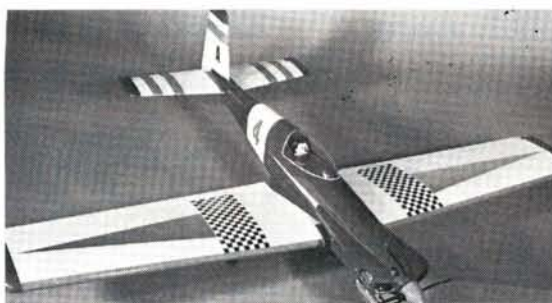
**HiTec/RCD**, 10729 Wheatlands Ave., Ste. C, Santee, CA 92071.

**Airtronics Inc.**, 11 Autry, Irvine, CA 92718.



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## MEMORIAL FLY-IN

(Continued from page 72)

### AWARDS

Early on Saturday afternoon, flying was suspended for an awards ceremony. Pat Hartness emceed and started by explaining why this fly-in is called the "Joe Nall Memorial Fly-In": Joe, a top executive in the FAA and a close friend of Pat, was tragically killed in a plane crash in South America several years ago.

- The Joe Nall Award was presented to O.W. Maness for his always helpful enthusiasm over the years.

- The Bob Smith Award was presented to Miles Reed for his most realistic flying over many years.

- The Good Old Boy Award went to Jerry Smith. (It was a leather flight jacket.)

Closing the brief ceremonies, Pat said he had heard a rumor that the Fly-In would be no more. He made the point very clear that all his facilities would be available to the sponsoring clubs if they wanted to continue. The flying then continued for the rest of the afternoon.

After the day's official flying, Mac Hodges again put on a beautiful demo flight with his big B-29. On this flight, however, he blew the landing. The next thing we knew, he was taxiing that big bird back up the runway. The announcer said, "Mac didn't like that last landing, so he's going to try again."

Turning into the wind, Mac made another flawless takeoff, gracefully climbed out, turned into the downwind leg, turned on to final and made a perfect landing. All really good R/C pilots hate to botch a landing, especially the last one of a meet. And they often do what Mac did, but not with a 16-foot B-29! He further confirmed his piloting qualifications with that.

(Continued on page 104)

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Bidirect. Graphite	5.7	21"	11.00
Bidirect. Graphite	5.7	42"	20.00
Kevlar	1.8	19"	8.00
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## MEMORIAL FLY-IN

(Continued from page 102)

### BARBECUE

Certainly one of the highlights of this outstanding fly-in is the Saturday-night barbecue and shrimp feed. It's held in the backyard of Pat's large, beautiful home, which is only about one third of a mile from the field.

Four hundred pounds of jumbo shrimp, flown in from Japan, are placed in several large ice boxes. Help yourself to the shrimp and sauce, and then go get a plate of delicious barbecued pork, hot sauce, beans and potato salad. If you're so inclined, there's a big beer truck serving Coors on tap—on the house. Then, for dessert, there are huge chocolate-chip cookies made right in Pat's kitchen (a tradition).

Pat is everywhere talking to the modelers. (I saw him about last in the food line.) Also, during the previous days of the fly-in, announcements were made that everyone was welcome to take the many nature trails through the woods on his estate.

It's obvious that not only is Pat a dedicated R/Cer, but also that he has a very warm spot in his heart for his fellow R/Cers.

### WELL-DESERVED THANKS

This meet would not have been possible without all the hard work of the members of

the sponsoring clubs: the Confederate Air Force, the Blue Ridge R/C and the Western Carolina R/C. I know I speak for all who attended this outstanding meet when I say we offer you our heartfelt thanks for all your hard work that meant we could have so much fun.

There's one fellow I want to single out for special praise because he had such a difficult, frustrating and certainly exasperating job—that of frequency and pin controller. Larry Nash handled this thankless job with patience, courtesy and coolness. I wouldn't have lasted over an hour—if that long.

And, finally, many thanks to Pat Hartness from all of us for so completely turning over his unmatched facilities to the R/C modelers. His generosity and comradeship are unique in the history of R/C modeling.

### AIRWAVES

(Continued from page 9)

absolutely boggles the mind to think that the noise of a model airplane engine is so offensive, when there are thousands of lawnmowers, "weedwackers" and leaf blowers out there disturbing the peace on any given day of the week.

Now—in our relenting and misguided ways to be politically and environmentally correct—worry about dB levels, bow to the noise

police, choke our engines with mufflers and don't dare fly before 9 a.m. on Saturdays and Sundays lest we disturb the yuppies' beauty sleep. No doubt much of this is due to the role played by increasingly greedy lawyers who capitalize on an increasingly litigious public ready to wreak havoc on our hobby. It's indeed a sad commentary that such a wonderful hobby has to succumb to such pressure, or should I say sink to such a level.

There are times when I wish my son and I could buy a Dyna Jet or an unmuffled McCoy .61, mount them on a test stand, and let them roar and scream full tilt as they once did at the fabled Mirror Meets or the old Willets Point parking lot in Flushing, NY.

I know mine is a voice in the wilderness, but something tells me that I'm not alone, and on that note I rest my case. By the way, as an amateur radio operator (N8WGW) I really enjoy Hal deBolt's articles on the "Golden Age of Radio Control." You're on the right track with your fine magazine.

By the way, not wanting to chance a visit from the noise police or a letter from a lawyer, our son's Aerostar is suitably muffled.

KURT H. Miska  
Ann Arbor, MI

*Kurt, you're not alone in glorifying the excitement of screaming model airplane engines—after all, we are taught from an early age that*

(Continued on page 118)

## Proctor Museum Scale Kits

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# GOLDEN AGE OF R/C



H A L D e B O L T

## THE WONDER OF V-K MODELS

ONE OF THE nice aspects of writing this column is being able to tell you about old friends who are a part of our R/C heritage. Another is how helpful you all are. When one of you asked about V-K Models, you reminded me of an old friend—Vern Krehbiel. I only had a little information on his company, but now, with your help, we can discuss this bit of history.

### V-K MODELS

I was into free flight when I arrived in Buffalo in 1939, so I was happy to find that the "Buffalo Aeronauts" were active in that phase. (Was there any other in '39?) Vern, who was a senior member, took me under his wing, and our lifelong friendship began.

Most of the Aeronauts were sport-type fliers who still enjoyed cabin-style, free-flight planes such as Buccaneers and Comet Clippers; there weren't many contest types. Vern flew a cabin-style plane he called the "Challenger." He offered a kit for the 68-inch-wingspan FF plane that was powered by a Baby Cyclone. Would you believe that it sold for a whopping \$4.50? This was Vern's entry into the hobby industry, although V-K Models wasn't established until 1960—some 20 years later!

That FF Challenger apparently confused me; I had thought the R/C Challenger was the first V-K kit. Now I realize that the Mach I—a neat plane with a 68-inch-span shoulder wing and a multi-channel reed radio—was the first. It sold well. The second kit—the Compact—was a scaled-down version of the Mach I that was intended for smaller engines.

The next kit was called the "Navajo." It was a cabin-type plane with the typical Cessna look. The R/C Chal-



Here's a rare photo from the early '50s. Left to right: George Swank with his Super Buccaneer, Frank Schmidt and his LW Cruiser (note the Schmidt ground-based reed transmitters) and me with my Equalizer.

lenger followed. It was a far cry from the original free-flight model! It continued the Cessna look, but it had a liaison-style cabin. The 60-inch-span Challenger was a multi-powered plane with .29 to .35 engines.

While these first V-K kits were fine designs, they were similar to many that were offered at the time. V-K had not yet offered an outstanding low wing.

V-K hit the big time with the Cherokee kit. An ad said "Thousands were built and flown"; I believe that I observed one of Vern's last production runs while the company was still manufacturing it.

In those days, Ed Kazmirski demon-

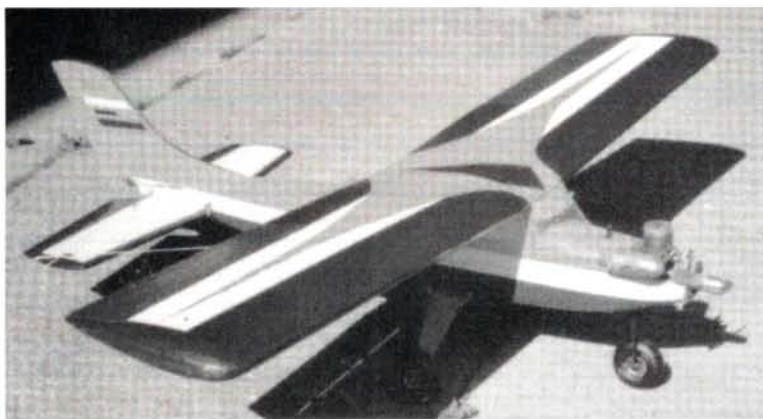
strated the value of using a thick, 18-percent airfoil with his Taurus design. With power on, it had a lot of lift for maneuvers, and with the power at idle, the additional drag produced slow flight for easy landings. Vern must have recognized this as a valuable asset for sport-type fliers and adapted it for the Cherokee.

It was a big, .60-powered plane with more than 750 square inches of wing area. Patterned after the well-known, full-scale Piper, its performance, complete maneuverability and scale appearance appealed to a multitude of R/Cers. A Sunday flier was in his glory with a Cherokee. After all these years, the fact that Proctor Enterprises recently produced the kit again is a testimony to its popularity.

In due time, it was apparent that another kit aimed at the popular .40-size engines would be welcome. The Cherokee Babe was fundamentally a scaled-down version of the Cherokee.

V-K's most noteworthy achievements

were probably their scale kits. I recall spending a quiet summer evening with Vern as we assembled the prototype Nieuport for its first flight. The word in the pits was that it would be a wonder if the old WW I design came home in one piece! Amazingly, it lifted off gracefully and turned in a scale-like performance—just as we had hoped. The future of V-K scale kits was assured.



Bill Cowles of Waverly, NY, says his fine-performing Challenger is an example of the excellent V-K kits.



An average modeler who had been used to quick-build kits would probably have gasped at the multitude of parts in a V-K scale kit. V-K tried to duplicate the full-scale aircraft, so each kit required a large number of precisely machined parts. The result was a museum-quality R/C model that anyone would be proud to own.

The Nieuport was followed by a Fokker Triplane and a Sopwith Camel. Could it be that Vern had the Red Baron in mind? These three comprised the V-K scale fleet. I believe V-K contemplated a *golden age* Alexander Eagle Rock, but I don't believe it ever made it into a box before V-K closed.

It's obvious that any modeler would admire the contents of a V-K scale kit. It remains, however, for a kit manufacturer to duplicate the effort that's required to produce such a kit. Remember the great number of parts? *Each* finished part represented special tooling and labor. The small parts for a scale structure are especially difficult to manufacture, but V-K scale kits were jammed full of these small, finished parts. It's a wonder that they produced so much at an acceptable cost!

I must acknowledge Bill Cowles of Waverly, NY, Al Boeglin of Jasper, IN, and Tom Ailes, of Valpariso, IN, for all their help. An article by friend Jim Kosticky of Buffalo, NY, also filled in some blanks.

I also received a welcome note from Vern himself. I'm pleased to tell you that he is still at his longtime address, and he models as much as his health will allow. Unfortunately, his wife of 45 years has passed away. Shirley was an active part of V-K.

I hope this has filled in some of the historical holes you might have wondered about. Does anyone have anything to add?

## R/C GOLD MINE

A nice package came from Charles Spear, of Mocksville, NC, who writes "Current News" for *R/C Report*. Charlie found a gold mine of old R/C photos as he was preparing to move to a new home. He thoughtfully sent them to me, so you can all enjoy them in future columns. I'll

## TAMPA R/C AIRCRAFT CLUB

**O**bviously, of the many things that brought us to where we are today, the AMA and our local clubs are paramount. I believe that club history is interesting, and I welcome information about any clubs, including your own.

Flying buddy Fred Mulholland and Don Haas of Tampa share this material on their 46-year-old organization, which is still healthy and growing. In 1947, when C/L and FF reigned supreme, the need for an "official" flying site caused Tampa modelers to form the Tampa Trim Tabs modeling club. Fred was one of the original organizers, along with Earl Brocklehurst and Phil Cota, a hobby-shop owner.

During WW II, the USA was dotted with military flying fields. One such training site for P-38 pilots was Drane Field (later named Henderson) on the outskirts of Tampa. At the end of the war, many of these flying fields were closed, and they became exemplary modeling sites. The Tampa Trim Tabs obtained the use of Henderson Field, and it remained their home field for more than 40 years.

With the arrival of R/C, the club changed. To better exemplify the club's new character, it was renamed the Tampa R/C Aircraft Club. Since then, membership has grown to more than 150. A majority are active fliers.

As Tampa expanded, Henderson Field was turned into building lots, and TR/CAC needed a new flying site. This progressive group approached county officials, and they now fly at Bing County Park. They have recently completed a new first-class facility with paved runways and a shelter. I hope that Bing Field will also be haunted by models for the next 40 years and more!

The Tampa R/C Aircraft Club hasn't been especially competitive, but it has a nucleus of expert modelers who simply enjoy the sport. (Typical?) I should say that if you're into SAM (Society of Antique Modelers) activity, then club members Fred Mulholland and Pete Rafferty should be familiar to you.



*The Tampa Trim Tabs in 1958. Left to right: Bill Carnes' son, Bill Carnes, Harold Frey, Fred Mulholland and Colby Hinton. Does anyone recognize the models?*



*A young Walt Good and Bill Carnes discuss the intricacies of R/C at an early TTT meeting.*



*Action at TTT's Drane Field in '58. Colby Hinton is flying his Mambo. Note the ground-based transmitters and "stick boxes."*



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## AIRWAVES

(Continued from page 104)

the noisier a machine is, the more powerful it is (which usually means it does a better job doing whatever it does). But, in those halcyon modeling days of yesteryear, did engines always start on the first flip of the prop, and did no one suffer any hearing loss from excessive noise? Were lawyers content to make a living only through the amicable settlement of disputes? The particular images that one romanticizes about days gone by are admittedly a bit subjective, and while acknowledging that many do feel as you do, we nonetheless must beat the drum in favor of silencing our models. It's something much more specific than the occasional (and I think appropriate) longing for simpler and more sensible lifestyles that affects our view of this issue—it's the clear and present need to preserve flying fields and foster continued growth of the hobby. Besides, I believe quiet models are no less impressive than loud ones. As I argued in the "Editorial" in the September issue (and will continue to respectfully argue), quiet is cool.

TA

### HOW BIG IS BIG?

After reading the excellent "Fighting Piper L-4" by Gerry Yarrish in the January '93 issue, I have a number of questions concerning model aircraft size. Is there a limit to model size?

Would a  $\frac{1}{3}$ -scale B-29 (WS=46 $\frac{1}{2}$  feet), for instance, still be a model? If this plane were built would it have to be R/C or could provisions be built in for an on-board pilot? Other than physical building limitations what determines the maximum size? Are there legal or regulatory limits or standards?

Thanks for a great magazine.

R. PECMAN  
Pittsburgh, PA

Mr. Pecman, according to AMA technical director, Bob Underwood, the AMA National Model Aircraft Safety Code specifies that the maximum permissible takeoff weight of a model is 55lb. Anything over this weight falls into a special category. For models between 55 and 100 pounds, the model must be inspected by an AMA-appointed safety inspector (there are many throughout the country) who checks that the model meets proper building and safety requirements. Also, the inspector will issue a "flight limitation certificate" that may limit permissible flight routines to, e.g., straight flight with shallow banked turns, or selected aerobatic maneuvers. The model will be allowed to fly in any AMA sanctioned events and will be covered by the AMA event coverage. This inspection and certification for flight must be done prior to any event at which the model will fly. (You can't just show up and expect instant inspection and certification.)

To follow your example of a  $\frac{1}{3}$ -scale model of a B-29 (I'd like to see the workshop this one was built in!), I'd say if you fly it above 500 feet, regardless of its size, it may be regulated by the FAA as a remotely piloted vehicle (RPV)! It's interesting to look at the standards applied by other groups to aircraft in this general size range. If you actually get into the aircraft, it's a "home-built" and is considered by the FAA as an experimental aircraft. If your B-29 weighed less than 254 pounds, flew no faster than 55 knots, carried no more than five U.S. gallons of fuel, carried no passengers and had a power-off stall speed no higher than 24 knots, it would qualify as an ultralight aircraft under the FAA's Federal Aviation Regulation, Part 103. Anything not meeting these requirements (weighing more, going faster, etc.) requires a private pilot's license.

As the sizes of our model aircraft continue to grow and the weight and size of ultralight and experimental full-size aircraft decrease, it's a fair question to ask where the division is made between models and full-scale aircraft. If you're interested in giant-size models, consider joining the International Miniature Aircraft Association. The IMAA specializes in models with wingspans of 80 inches or more for monoplanes; 60 inches for biplanes; true  $\frac{1}{4}$ -scale models and 140-inch ducted fans (wingspan plus length equal 140 inches). Contact Don E. Vineyard, IMAA Secretary/Treasurer, 205 S. Hilldale Rd.,

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# ELICITING ELUCIDATION

As a student of your authors, I found that Andy Lennon's feature series on wing design and Carl Risteen's on flutter are right up my alley. As a special-interest publication, *Model Airplane News's* primary responsibility is to provoke thought through the dissemination of accurate, understandable information to its readership. I don't, for a moment, dispute your remarkable efforts to achieve accuracy. I'm suggesting that with a little extra effort, you and your authors can modify technical features slightly to help your readers who are not yet comfortable with the terminology to understand and apply the concepts, rather than cause them to flip to the next article out of intimidation. Perhaps the following suggestion may even motivate less technically experienced readers to get out the tape measure, calculator, pencil and paper.

At the beginning of each feature in the series, include a glossary that lists, alphabetically, the abbreviations of the terms used, their translations, their definitions and their formula derivations. Limit the early feature glossaries to the terms used up to that point in the series.

No offense to Andy Lennon when I say that his material is informative, unique, accurate, thought-provoking, sometimes even revolutionary, but nearly impossible for the average R/Cer who doesn't have an engineering degree to understand *completely*. Please make your readers' jobs a little easier.

MARK MCKOOL  
Oconomowoc, WI

Mark, you're right; our job is to entertain and educate. Our average reader has been in the hobby for more than a decade, and our success in recent years has resulted largely from an increase in the technical depth of our articles. Although, at first glance, your suggestion to list a glossary seems to have merit, it would become a burden, mechanically and pedagogically—which I think you would understand if you were to attempt to structure a series of

(Continued on page 120)



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3/32x3/16	.11	.16
3/32x1/4	.12	.17
3/32x3/8	.13	.19
3/32x1/2	.17	.22
3/32x3/4	.25	.33

1/8	36"	48"
1/8x1/8	.09	.12
1/8x3/16	.11	.15
1/8x1/4	.12	.18
1/8x3/8	.13	.19
1/8x1/2	.17	.24
1/8x3/4	.24	.33

3/16	36"	48"
3/16x3/16	.12	.18
3/16x1/4	.15	.20
3/16x3/8	.17	.21
3/16x1/2	.21	.27
3/16x3/4	.30	.41

1/4	36"	48"
1/4x1/4	.17	.22
1/4x3/8	.19	.27
1/4x1/2	.20	.31
1/4x3/4	.34	.45

5/16	36"	48"
5/16x5/16	.23	.29
5/16x3/8	.29	.32
5/16x1/2	.30	.39
5/16x3/4	.42	.56

3/8	36"	48"
3/8x3/8	.27	.39
3/8x1/2	.31	.44
3/8x3/4	.44	.58

1/2	36"	48"
1/2x1/2	.38	.55
1/2x3/4	.48	.66

BALSA SHEETS		
1-INCH	36"	48"
1/16x1	.29	.39
3/32x1	.32	.43
1/8x1	.35	.47
3/16x1	.37	.52
1/4x1	.42	.57
3/8x1	.54	.73
1/2x1	.60	.82

2-INCH	36"	48"
1/32x2	.33	.44
1/16x2	.33	.44
3/32x2	.40	.53
1/8x2	.43	.57
3/16x2	.49	.65
1/4x2	.56	.75
3/8x2	.73	1.00
1/2x2	.90	1.20

3-INCH	36"	48"
1/32x3	.37	.49
1/16x3	.37	.49
3/32x3	.44	.58
1/8x3	.55	.74
3/16x3	.63	.84
1/4x3	.75	.98
5/16x3	.87	1.15
3/8x3	.90	1.28
1/2x3	1.14	2.00

4-INCH	36"	48"
1/32x4	.58	.76
1/16x4	.58	.76
3/32x4	.72	.97
1/8x4	.82	1.09
3/16x4	.96	1.26
1/4x4	1.15	1.39
3/8x4	1.44	1.90
1/2x4	1.70	2.35

BALSA TRAILING EDGE		
36"	48"	
1/8x1/2	.18	.31
3/16x3/4	.29	.43
1/4x1	.32	.58
5/16x1/4	.39	.65
3/8x1/2	.46	.77
1/2x2	.70	.92

TAPERED AILERON STOCK		
36"	48"	
1/4x1	.43	.63
1/4x1/4	.50	.70
1/4x1/2	.57	.82
1/4x2	.63	.90
5/16x1/2	.59	.84
5/16x2	.67	.92
3/8x1/2	.65	.92
3/8x2	.74	1.05
3/8x2 1/2	.84	1.22
1/2x1 1/2	.80	1.15
1/2x2	.90	1.25

BALSA TRIANGLES		
36"	48"	
1/4x1/4	.25	
3/8x3/8	.30	
1/2x1/2	.35	
3/4x3/4	.45	
1x1	.55	

BALSA BLOCKS		
36"	48"	
1x2	.35	.55
2x2	.46	.75
2x3	.59	1.10
3x3	.93	1.85
3x4	1.25	2.50
4x4	1.60	3.10

WING SKINS		
10 1/2x24x1/16	3.15	
10 1/2x24x3/32	3.75	
12x36x1/16	5.35	
12x36x3/32	6.35	

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1/16x3	.62	.95
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3/16x3	1.05	1.59
1/4x3	1.23	1.85
3/8x3	1.50	2.43
1/2x3	1.85	3.00
3/4x3	3.00	4.10
1x3	4.15	5.70

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3/32x12x48	7.60	
1/8x12x48	8.25	
3/16x12x48	6.25	
1/4x12x48	6.25	
3/8x12x48	7.25	
1/2x12x48	9.00	

LIGHT PLY		
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1/8x12	3.40	
1/4x6	2.75	
1/4x12	5.50	

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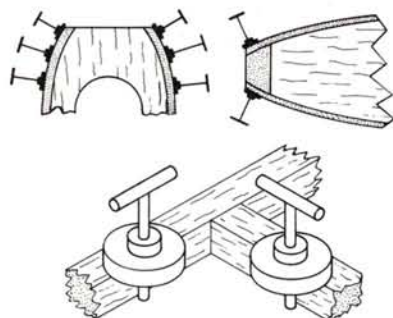
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## AIRWAVES

(Continued from page 119)

stand-alone magazine articles in that fashion. A textbook would be another matter.

It's true that there is much left out of Andy's articles, but that is, in fact, the nature of aerodynamics. Our attempt is to stimulate the reader's thinking while steering him in the right direction. Just as in the case of scratch-building models, much is left to the inquisitive reader to ferret out. At least we will have done our part in terms of showing the way and, hopefully, in an engaging and entertaining manner. Andy's comments will be of interest:

"Your comments are appreciated; your last paragraph is flattering. Your comment, 'sometimes even revolutionary' mystifies me. But above all, your criticism is positive and constructive. This is a refreshing change from some past correspondence.

"You suggest a glossary of symbols with definitions and formulas. Glossaries are common practice in aerodynamics textbooks. However, since my writings are a series of articles, I have deliberately avoided the use of symbols; I prefer to spell out the words. For example, I will write 'lift coefficient' rather than just 'CL.'

"Further, to define lift coefficient and provide formulas for its use would require the lengthy explanation given in the two-part article, 'Airfoil Selection' (Model Airplane News, May and June '92).

"The use of symbols in formulas is the exception. In each, the symbols are carefully defined below the formula; and frequently, actual numbers replace the symbols to illustrate that these formulas are easy to solve using ordinary arithmetic.

"Above all, I do not believe that a glossary would help you to understand the portion that evades you. Aerodynamics is a complex subject. Its comprehension demands a reasonable level of education and a deep interest and close study on the part of the reader.

"My articles are condensations of years of study and experience with both models and full-scale airplanes. Covering the subject adequately, yet being brief enough to be interesting is not easy. Inevitably, some points may not be adequately covered. Since I am not a mind reader, the need for more explanation must come from the reader. Letters that briefly outline problems, addressed directly to me (Andy Lennon, 487 Oakville Rd., Dollard Des Ormeaux, Quebec, Canada H9G 1M1) will be welcomed and answered directly as quickly as time permits.

"It should be clearly understood that for the benefit of other readers, both the question and answer may be published, at the discretion of the editor, in upcoming 'Airwaves' columns. Thank you for an encouraging letter, and I look forward to your questions."

## UNEARTHED ITEMS

I have unearthed three items that I'd like information on.

- Where can I get a Super Tigre .35 repaired? It's approximately 20 years old, and fuel leaks out where the cylinder head meets the piston body.

- What can you tell me about an HP .61 ball-bearing engine? Why is it no longer available? Is it worth using? Mine has never been run.

- I have a partial set of plans for a Cessna Sky Master from Model Airplane News plans. I think it's plan no. 2. I was told the plan was lost on its way to the printer and never replaced. Is there any hope?

CARL R. DESANTIS, JR.  
Glens Falls, NY

Carl, here are the answers to your questions, in order:

- Contact Great Planes Hobby Services at (217) 398-0007. They handle all U.S. customer service for the Super Tigre line. As I remember, this old cross-flow-ported Super Tigre .35 started out as a control-line engine with very high compression. To make it more suitable for R/C use, several steel gaskets were installed between the head and the liner flange to lower the compression and improve the idle. It's quite conceivable that a leak has developed between these gaskets, especially if one is cracked. If this is the case, the fix is obviously simple.

- You don't say which HP .61 you have: the four-bolt head or the six-bolt head version? In either case, in my opinion, you have a great, smooth-running Schnuerle-ported engine that's well worth holding on to and running. The HP engines are now sold by RJL Industries USA, P.O. Box 5, Sierra Madre, CA 91025; (818) 359-0016. RJL still sells the later six-bolt Gold Cup .61, and they offer almost every part for the older four-bolt .61. Give them a call; they'd love to help out.

- I'm sorry, Carl, but the Mylar original of the Sky Master plan was lost to us some time ago, and without it, there's no way we can help you out. We wish we could. Does any other reader have a copy of this plan? We're also interested in obtaining one.

CC

## PLANNING FOR PLANS

I am very interested in designing new aircraft. Could you please tell me where and how you get the designs for your "plans" section? If I wanted to publish a new design through your magazine, what would I have to do? I would appreciate as much detailed information as possible. I am a subscriber and great fan of your magazine.

TOM VAN DER ZALM  
Bloomington, IL

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model to Model Airplane News, attention: Editor-in-Chief Tom Atwood, 251 Danbury Rd., Wilton, CT 06897. It is also a good idea to call us to verify that we received your photos and description.

If we are interested in pursuing the design, you will need to supply full-size plans (pencil drawing is fine), photos of the complete construction (10 to 25 black-and-white prints, with negatives) and written text of about 2,000 words. (If it's longer, you'll have to discuss this with us in advance.) Before you start designing a model or writing an article you intend to submit for publication, call us for a contributors' guideline package and to obtain our general approval for the project.

When we publish the article, you'll be paid (usually between \$500 and \$1,000, depending on project complexity and related factors); we will retain all copyrights to the article and will retain the right to sell the plans in perpetuity.

The plans then become part of modeling posterity in our construction library. You retain rights to the design and could, if you wish, produce a kit or parts for the design. It's really that simple. Give it a shot; we'd love to hear from you.

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**10TH ANNUAL FLY-IN FESTIVAL** at the R/C World flying site in Orlando, FL. Join the fun on Thanksgiving Weekend (Friday, November 26 to Sunday, November 28). This is an AMA-sanctioned Class C event. Aircraft noise must not exceed 90dB at 3 meters; AMA safety code and weight limit apply. Contact Dixie Cutrone (CD), 1862 Mahogany Dr., Orlando, FL 32825; (407) 380-6359. Need accommodations? The **R/C World condos** are available for a super R/C and Disneyworld vacation, but they must be reserved in advance. Contact Lonie Charlson, (407) 380-6359. [12/93]

**R/C WORLD ORLANDO, FL, CONDO RENTAL:** 2 bedroom, furnished. Available weekly or monthly. Low rates. 100-acre flying field with enclosed hangars. Close to Disney World and Epcot Center. For information, please call or write to R/C World, 1302 Stearns Ct., Orlando, FL 32825; (407) 380-6359.

**WANTED:** model engines and race cars before 1950. Don Blackburn, P.O. Box 15143, Amarillo, TX 79105; (806) 622-1657. [6/94]

**WANTED:** your old proportional radios; interested in pre-1980, American made; C&S, Deans, Kinetronics Spar and others. Older is better. Ron Gwara, 21 Circle Dr., Waverly, NY 14892; (607) 565-7486. [9/94]

**WANTED:** model-airplane engines and model race cars made before 1950. Jim Clem, 1201 E. 10, P.O. Box 524, Sand Springs, OK 74063; (918) 245-3649. [6/93]

**SCALE AIRCRAFT DOCUMENTATION and RESOURCE GUIDE.** World's largest commercial collection. Over 4,000 different color Foto-Paks and more than 22,000 three-views. Catalogue—\$5 (\$10 foreign). Scale Model Research, 3114 Yukon Ave., Costa Mesa, CA 92626; (714) 979-8058. [2/94]

**P/C—THE EASY WAY** to simulate metal panels; \$1 gets information and sample. Clarke Smiley, 23 Riverbend Rd., Newmarket, NH 03857. [12/93]

**1930s to 1950s MODEL AIRPLANE MAGAZINES**—1930s aviation pulps—complete and in good condition; \$1 for list. Bruce Thompson, 328 St. Germain Ave., Toronto, Ontario, Canada, M5M 1W. [12/93]

**ENGINES: IGNITION, GLOW, DIESEL**—new, used, collectors, runners. Sell, trade, buy. Send \$2 for large list to Rob Eierman, 504 Las Posas, Ridgecrest, CA 93555; (619) 375-5537. [11/93]

**LOCKHEED P-38 LIGHTNING**—Are you a P-38 Lightning fan?—R/C models or full-size? Join the P-38 Model Organization International! For more information, send \$1 to the P-38 Model Organization International, Medeltbyvej 54, 2610 Rodovre, Copenhagen, Denmark. [2/94]

**MISSILE SECRETS**—engines, rockets, U-build. \$2. Northtech-A5, 813 Cherry Ave., Albany, GA 31710

**CARBON FIBER**, 100 ft. 12K tow—\$9.95 plus \$2 S&H, for information send SASE to: Discount Composites, P.O. Box 96, Bountiful, UT 84011-0096. [11/93]

**SCALE DOCUMENTATION: PLAN ENLARGING.** 140 super-scale, sport and giant R/C construction plans, three-views, cutaway drawings. More than 100,000 documentation photos in stock. 120-page catalogue: \$5 (\$10 air overseas). Jim Pepino's Scale Plans and Photo Service, 3209 Madison Ave., Greensboro, NC 27403; (919) 292-5239. Visa/MC [4/94]

**WANTED:** old engine parts, misc. junk before 1970. Wesley Pettinger, 1501 Banbury Ct., Richardson, TX 75082; (214) 669-4003. [7/94]

**CUSTOM KIT BUILDING**—Will build most kits from trainers to quarter scale; 20 years experience. Write for quotes. Midwest Model Factory, 280060 Highland Rd., Minatare, NE 69356. [9/93]

**SALE**—Kits wood, plastic, ignition engines, parts and mags (pre-1965) LSASE \$6.00. Specify needs. Leonard Roberts, 3819 Lydon Ln., Moosic, PA 18507; (717) 961-2357. [11/93]

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**CLEVELAND KITS (AND PLANS) WANTED:** Immediate cash, call or ship for offer. Ship to Jay Herbert, P.O. Box 1286, Mattituck, NY 11952. Phone (516) 298-4135 or fax (516) 298-4181. [3/94]

**ANTIQUE IGNITION AND GLOW PARTS CATALOGUE:** 100 pages—timers, needle valves, original cylinder heads, point sets, drive washers, stacks, spark plugs, plans. Engines: Atwoods, Baby Cyclones, McCoy's, Hornets, others. \$8 post-paid, U.S.; \$20, foreign. Chris Rossbach, R.D. 1 Queensboro Manor, Box 390, Gloversville, NY 12078. [2/94]

**MAGAZINE BACK ISSUES**—Flying Aces, Model Airplane News, Air Trails, 1930s and '40s. FM, RCM and more. Send SASE for list to Carolyn Gierke, 1276 Ransom Rd., Lancaster, NY 14086. [2/94]

**WANTED**—World War II and postwar recognition models. Old toy airplanes, cars, trucks, Zeppelin, etc. Bill Fornwalt, 103 Dartmouth Ave., Johnstown, PA 15905. [11/93]

**FOUR 1993 SCALE CATALOGUES**—SPPS super-scale plans; SPPS scale documentation; ASP scale-plans handbook; ASP aircraft scale-drawings handbook (three-views); 140 different scale plans—120,000 photos. Catalogues—\$5 each; overseas airmail, add \$5 (1 to 4 catalogues); Visa, MC. Jim Pepino's Scale Plans and Photo Service, 3209 Madison Ave., Greensboro, NC 27403; (919) 292-5239. [4/94]

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**SCALE WW I Plans:** Send \$1 for current list. "Smileys," 23 Riverbend Rd., Newmarket, NH 03857. [2/94]

**NEW ZEALAND AERO PRODUCTS**—Scale plans: Agwagon, Pawnee, Pawnee Brave, Airtruk/Skyfarmer, Fletcher FU-24, Aerobat, Hall's Springfield Bulldog, Typhoon, DC-3/C-47, Fairchild PT-19/Fleet PT-26 and more. Fiberglass parts, hardware packs; timber packs; color photo packs available. Free documentation with plans. Catalogue/price list: \$5 (U.S.); Visa/MC. 34 Ward Parade, Stirling Point, Bluff, New Zealand; (03) 2128192. [4/94]

**FREE**—Tesla turbine plans. Contact Dan, 1214 N. 6th St., Port Hueneme, CA 93041. [2/94]

**WANTED**—Kraft KP-4/6 from 1964-66. Karlheinz Schmid, Stieranger 7, 8900 Augsburg 21, Germany. [2/94]

**FIBERGLASS MASTER COMPANY** is for sale; all or part. We have 700+ working molds for cowl, wheel pants and other parts to be made out of fiberglass. Asking price—\$75,000. Call (703) 890-6017. [9/93]

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**HARD-TO-FIND SPECIAL EFFECTS** materials and parts. Send a self-addressed stamped envelope to: Uncle Waldo, Special Effect Supply, P.O. Box 2068, Salt Lake City, UT 84110-2068. [11/93]

**INTERNATIONAL AIRCRAFT RESEARCH**—need documentation? Include name of aircraft for availability of documentation with \$3 for photo and three-view catalogue. 1447 Helm Ct., Mississauga, Ontario, Canada L5J 3G3. [11/93]

**THE PLANE FACTS NEWSLETTER!** Dedicated to new and prospective pilots. Money-saving information, getting started, inside tips, how-to's. \$15 for 12 monthly issues. Missouri residents, please add sales tax. The Plane Facts Newsletter, Dept. 101, 1533 NE Ivory Ln., Lee's Summit, MO 64063. [11/93]

**WANTED: Control-line Profile Kits:** Midwest P-63, Skyraider, P-51, ME-109, Sterling Navion, Starfire, Skyhawk, P-40, Sportster, Rotovale, Dynamic 19/60, McCoy 19/35 RD/BL, K&B 19/35 grn. throttles; McCoy 19/35 R/C RD/BL engines, 3-line bellcranks. Paul Patterer, 114 Mosher Ave., Battle Creek, MI 49017; (616) 965-5364. [11/93]

**SHOP PLANS**—Build a 24x36-inch hobby cabinet that expands to 24x72 work area. Send \$2 for illustrations; \$12 for full plans to Ernie Townsend, 74 Tidan Heights, 53279 Range Rd. 225, Sherwood Park, AB, T8A 4V1, Canada. [11/93]

**FOR SALE:** R/C flight simulator. Dave Brown program and transmitter. New—\$75. Victor Park, 1907 Mt. Vernon Ave., Point Pleasant, WV 25550. [11/93]

**POLY BAGS!** Mini-size Zip-locks®. 1 1/2" x 2", 2" x 2", 2" x 3". 50 assorted/\$3.50. \$4 100/per size. Order now! Vaughns, 407MA Byrnes, Allendale, SC 29810. [11/93]

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**WRENCHES AND GASKETS** for vintage and newer engines Bob McCord 325 Sylvan Mountain View, CA 94041. [3/94]

**SCALE DOCUMENTATION-MODEL PLANS**—Drawings, photo packs, monographs, unusual aircraft. Illustrated catalogue: \$2 (post-paid). Bill Young, 8106 Teesdale, N. Hollywood, CA 91605. [4/94]

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**GRAND OPENING**—Magic Tunes Catalogue. CDs, tapes and accessories for your listening pleasure. Grand opening prizes, giveaways, gifts, special offers. Send \$2 to Box 65031, Los Angeles, CA 90065. [12/93]

**WANTED**—Guillow's discontinued 100 series World War I kits, deHavilland 4 kit: no. 205; World War II Mosquito kit: no. 804; Airacobra kit: no. 806. Collector will pay top prices. George Santikian, 7285 N. Channing, Fresno, CA 93711; (209) 439-3393. [11/93]

**WANTED**—unfinished Mark Frankel's Lear 35A; reasonable price. Rich, 2809 Skyline Dr., West Mifflin, PA 15122; (412) 466-7292. [12/93]

**KIT FOR SALE**—the biggest fox of them all! Buzzard 144 R/C 12-foot sailplane designed by Duke Fox: \$200 (plus \$10 S&H). Joel Balsam, 4 Pickwick Hill Dr., Huntington Station, NY 11746; (516) 271-3267. [11/93]

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# PRODUCT NEWS



## FUTABA Acrostar 120

Here's a new ARF that's ideal for lovers of big 4-strokes. Designed for the YS120 and YS120AC engines, the Acrostar 120 comes 90-percent finished, requires no painting or covering and includes everything you need for assembly. It performs knife-edges, snap rolls and tricky maneuvers with precision and grace. Specifications: wingspan—67.5 inches; length—56.6 inches; wing area—806 square inches; weight—9.50 to 9.75 pounds.

**Kit no.**—YS0071; **price**—\$549.95

**Futaba Corp. of America**, P.O. Box 19767, Irvine, CA 92713-9767; (714) 455-9888.

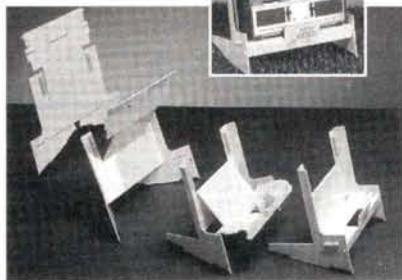


## WESCRAFT The Weird 1

With its swept-forward 65-inch wingspan and canards with elevators, the Weird 1 has stable flight characteristics that allow it to be flown on any .40 to .46 engine by intermediate fliers. It does aileron rolls and inverted flight with minimum down-elevator input. The kit includes plans, wing and canard foam-cores, and all the wood and sheeting necessary to build it; some hardware is included.

**Price**—\$119.95

**Wescraft**, 43176 Business Park Dr. #104, Temecula, CA 92590; (909) 695-0735.



## JDM PRODUCTS Redi-Rac Transmitter Stand

Keep your transmitter off the ground and away from dirt and moisture with this unique, one-piece transmitter stand. Molded of polypropylene plastic, it can easily be snapped into shape and then "unsnaped" and carried flat when not in use. It's stable, and its convenient tilt-back angle allows easy access to controls. There's also a choice of colors: red, white, blue, fluorescent orange and hot pink!

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**JDM Products**, 543 Bedford St., Concord, MA 01742; (508) 369-9212.

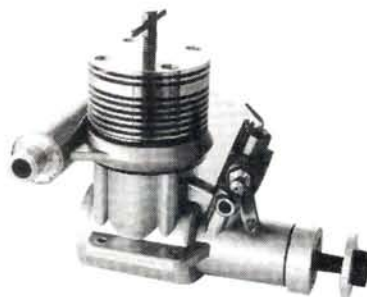


## IRODA Cordless Soldering Iron

This butane soldering iron's sleek, pen-like shape makes it convenient to use anywhere. Its butane reservoir allows up to 60 minutes of continuous use and, with its interchangeable tips, it can also act as a blow torch, a hot blower and a hot cutter.

**Price**—\$29.95

**H&C Inc.**, 1931 Tanfield Dr., Matthews, NC 28105; (704) 841-1846.



## CARLSON ENGINE IMPORTS .29 & .35 Diesels

Just introduced by Progress Aero Works of England, these .29 and .35 single-ball-bearing engines are designed to be superior substitutes for .35 to .45 sport, glow, 2-strokes. They're available in standard and R/C versions and are fully guaranteed by their manufacturer. Specifications: suggested props—11x6 to 14x6; power ratings—.50hp to .65hp; speed range—3,000 to 12,000rpm; weight—10 to 11 ounces.

**Prices**—\$95 (standard); \$105 (R/C); plus \$4 S&H.

**Carlson Engine Imports**, 814 E. Marconi, Phoenix, AZ 85022-3112; (602) 863-1684.



## NEWMAN OPTICS Zurich Yellow Lens

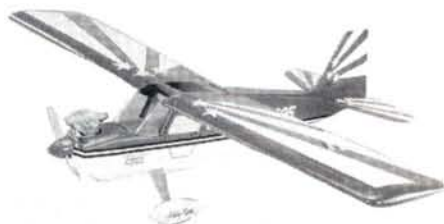
Do you have trouble seeing your aircraft on dark, cloudy or hazy days? With their special metallic coating and wraparound design that allows 180 degrees of distortion-free vision, the Zurich Yellow Lens might be what you need. It offers exceptional contrast and depth perception, and it can also be worn to advantage when driving in fog or at night.

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**Newman Optics**, 5083 Ridgedale Dr., Ogden, UT 84403; (801) 476-1177; fax (801) 479-7733.



# PRODUCT NEWS



## GLOBAL HOBBY Super Decathlon 40 ARF

Made by Thunder Tiger Model Co., this all-wood ARF comes covered in colorful, scale, red, white and black heat-shrink plastic film. The kit includes all the required hardware; a clear, molded windshield; molded cowl parts, wheel pants and stab fairings; a white spinner; formed-aluminum landing gear; an aluminum motor mount; a fuel tank; a steerable tail wheel; wheels; horns; pushrods; clevises; and decals. Specifications: length—45 inches; wingspan—64 inches; wing area—694 square inches; engine—.40 to .46 2-stroke; weight—6 pounds. You supply a 4-channel radio, a prop and an engine.

**Kit no.**—111800; **price**—\$285.

**Global Hobby Distributors**, 10725 Ellis Ave., Suite E, Fountain Valley, CA 92728-8610; (714) 963-0133.



## AEROLOFT DESIGNS Photo Documentation

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**AeroLoft Designs**, 2940 W. Gregg Dr., Chandler, AZ; (602) 838-0447.



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**Aerotrend**, 31 Nichols St., Ansonia, CT 06401-1106; (203) 734-0600.



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**BTM Corp.**, 300 Davis Rd., Marysville, MI 48040; (313) 364-4567; fax (313) 364-6178.



## COMBAT MODELS INC. A-10 Warthog

This A-10 Warthog kit has a molded, eight-piece airframe, hardware, bombs and missiles, and it comes with a video. Specifications: wingspan—52 inches; wing area—423 square inches; power—.35 to .45 pusher; weight—6 to 8 pounds; radio—4-channel (6-channel if you want operational flaps and retracts).

**Kit no.**—CBM300; **price**—\$259.95.

**Combat Models Inc.**, 8525 Arjons Dr., Ste. K, Miramar, CA 92126; (619) 536-9922.



## COLORADO HOBBY PRODUCT Propellers

*Handmade* by J.A.S. Woodproducts Co. in the Czech Republic, these light beech-wood props are available only in limited quantities. Their tips were designed to give a quieter, better, overall performance (more thrust) than that of conventional props. They're available in standard sizes—14 to 30 inches—and can also be custom-made to your specified size and pitch.

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**Colorado Hobby Product**, 4635C Park Vista Blvd., Colorado Springs, CO 80918; (719) 522-0935.

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# NAME THAT PLANE

## CAN YOU IDENTIFY THIS AIRCRAFT?

If so, send your answer to *Model Airplane News*, **Name That Plane Contest** (state issue in which plane appeared), 251 Danbury Rd., Wilton, CT 06897.

CONGRATULATIONS to Richard Howren of Collierville, TN, for correctly identifying the August '93 mystery plane. The aircraft is a Martin 4-0-4 that was flown by Eastern Airlines during the '50s. An improved version of the 2-0-2, the 4-0-4 could carry 40 passengers, and it had an air-conditioned, pressurized cabin. The plane—serial no. 440A—is shown on a test-flight over the Glenn L. Martin Co. airport. It was one of the first 60 planes ordered by Eastern



PHOTO COURTESY OF BOB BANNA'S SCALE MODEL RESEARCH

Airlines to replace the war-weary Douglas DC-3 fleet. Powered by two 2,400hp Pratt & Whitney R-2800 radial engines, it had a wingspan of 93 feet, 3 inches; a length of 74 feet, 7 inches; and a gross weight of 44,900 pounds. It had a cruise speed of 225mph and a maximum air speed of 312mph. In all, 103 4-0-4s were built, and two were delivered to the U.S. Coast Guard.

The winner will be drawn four weeks following publication from correct answers received (on a postcard delivered by U.S. Mail), and will receive a free one-year subscription to *Model Airplane News*. If already a subscriber, the winner will receive a free one-year extension of his subscription.

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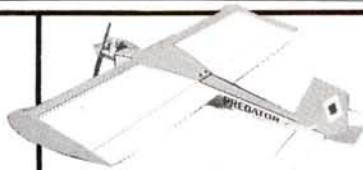
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•Span 48" •Eng: .19-.45 •4-ch radio  
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# CLUB OF THE MONTH



## LUFTSPORTCLUB 63 BÜDINGEN

c/o Stephan Dürrstein, Raabestraße 30,  
63165 Mühlheim/Main, Germany

ACROSS THE ATLANTIC is a club whose flying field is 10 miles away from a place where knights and horses marched off to fight the Holy War during the Middle Ages. The Luftsportclub 63 Bidingen in Bidingen, Germany—approximately 30 miles from Frankfurt/Main—boasts old castles, ancient walls and huge gates. Its president, Helmut Dürrstein, and its 50 members are celebrating the club's 30th anniversary this year.

The club's participants include youngsters who are learning how to build and fly model airplanes. Meetings usually take place on weekends and, according to Helmut, you'll find planes that range from small, simple gliders to giant scale—some even made in the USA! The members keep up with the latest by reading *Model Airplane News*.

The club uses an enormous grass field with a 400-foot runway! The noise level is limited to 80dB; a good muffler can make this possible as well as guarantee a pleasant, quiet flight.

The Luftsportclub participated in this year's Top Gun event in West Palm Beach, FL. Helmut's son Stephan received the "Best Civilian Aircraft" award from Lanier RC for his DC-3, "Sentimental Journeys."

Helmut ended his newsletter by thanking all the people he met and the friends that he made at Top Gun, and he closed by extending them an invitation to visit him in Bidingen. We may just do that. For your warm invitation and in celebration of your club's 30th anniversary, we award you two complimentary subscriptions to *Model Airplane News*. Viel Vergnügen!

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**Retailers:** Make your business grow with new traffic! Now you can advertise your hobby shop in the *Model Airplane News Hobby Shop Directory*. The listing will be published monthly and will be listed according to city and state. You have 3 to 4 lines, approximately 20 words, in which to deliver your sales message, plus space for your store's name, address and telephone number.

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by JEF RASKIN



## ONE WEEK TO SOLO

**Subject:** how to fly gas-powered R/C models for the beginner.

**Source:** 1st U.S. R/C Flight School, P.O. Box 594, Shawano, WI 54166.

**Summary:** a lot of what the beginner needs to know, well produced.

**List price:** \$34.95.

**Approximate length:** 2 hours.

Every flight-training program has its "twist" on how best to get beginners in the air. The "1st U.S. R/C Flight School" recommends trainers with the rudder electronically coupled (through a simple Y-connector) to the ailerons to get the beginner off to a good start. This makes some sense as it gives the novice a 3-channel model (ailerons, elevator and throttle), which automatically makes coordinated turns. There are other approaches equally good, but this tape represents a well-thought-out and pretty clearly presented introduction to flying R/C models. If newcomers to our sport follow these

recommendations—including join a club and the AMA, get an instructor, and have an expert set up and test-fly your plane—they are likely to quickly succeed in learning to fly.

An instructor who subsequently works with students who have watched this tape will find them well prepared to learn to fly properly. They will have a good understanding of which controls do what. That an airplane banks with the ailerons and turns with the elevator is clearly explained, as is the use of throttle to control altitude. An unusual and praiseworthy innovation is a section aimed at instructors specifying exactly how to set up elevator and aileron throws for rates appropriate for beginners.

Only occasionally falling into the trap of talking about rather than showing, David Scott makes good and almost continuous use of a split-screen technique, which shows stick movements at the transmitter as we see the plane fly. The flying is done well, and it sets a good example for the beginner. Their techniques for learning to fly in any direction with respect to the pilot and how to hold a transmitter (keep the thumb off the top of the stick!) are time-tested and solid. A few extraneous topics, such as how to handle models with conventional landing gear (tail-draggers), could have been omitted but, for the most

part, the instruction is well-focused (as were the cameras).

There are a few places where things get a bit confusing to the beginner; some terms such as "cross-wind landing" and "stall" are employed without being first defined. The use of trim levers is not discussed, and the captions and narration do not agree with the action on a few rare occasions. There is no information on building and maintaining model airplanes or starting and operating engines: this video is about how to fly, and it does the job it sets out to do.

## WORKSHOP '92

**Subject:** how to vacuum-bag a wing.

**Source:** Composite Structures Technology, 2090 Andre Ave., Los Osos, CA 93402-2904; (800) 338-1278.

**Summary:** clear and helpful demonstration by a pro.

**List price:** \$24.95 (comes with \$5 certificate toward next CST order).

**Approximate length:** 44 minutes.

When I was a child, if anyone had told me that I'd be flying model airplanes with wings made of glass someday, I'd have thought he was crazy. But fiberglass, Kevlar and other modern materials have led to aircraft parts that are stronger, lighter and more accurate with better finishes than could have

(Continued on page 129)



## VIDEO VIEWS

(Continued from page 128)

been imagined only a short while ago.

The basic idea in vacuum-bagging is to let air pressure squeeze epoxy-impregnated cloth against a lightweight form made of polystyrene foam. The epoxy sets overnight and yields a monolithic structure. A slick, ungluable Mylar film on the outside of the cloth is pulled away to reveal a mirror finish to the part. A new technique that's presented here consists of painting the Mylar first. The paint transfers to the part, so that it comes out of the bag painted, needing just a bit of touchup around the edges.

The quality of this tape springs directly from the expertise of Matt Gewain of CST, who speaks clearly and authoritatively on structural considerations, proper materials and the techniques that are necessary to get good (or even spectacular) results from vacuum-bagging. In passing, he mentions how to make composite spars and hollow wings. We watch him don gloves (a good idea) and build a wing for us.

Workshop '92 demonstrates that usefulness in a video doesn't spring from fancy production but from quality of content. All that was done was to put a camera on a tripod, point it at the presenter (with an occasional zoom in for detail), and then edit out the waiting. This tape shows us that with the right materials and some practice, making great composite parts isn't difficult. The cost of all this technology isn't mentioned, but there's an 800 number on the box if you want to find out.

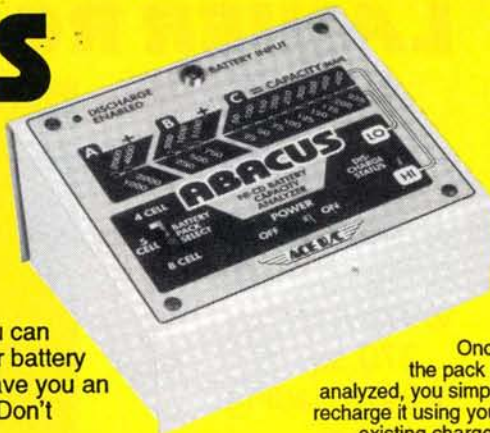


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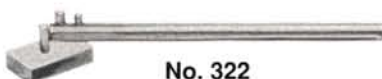
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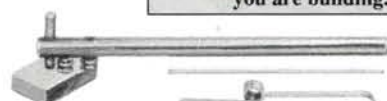
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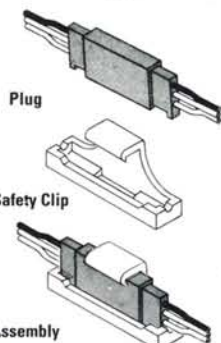
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